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JUNE 1985

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ISSUE 6

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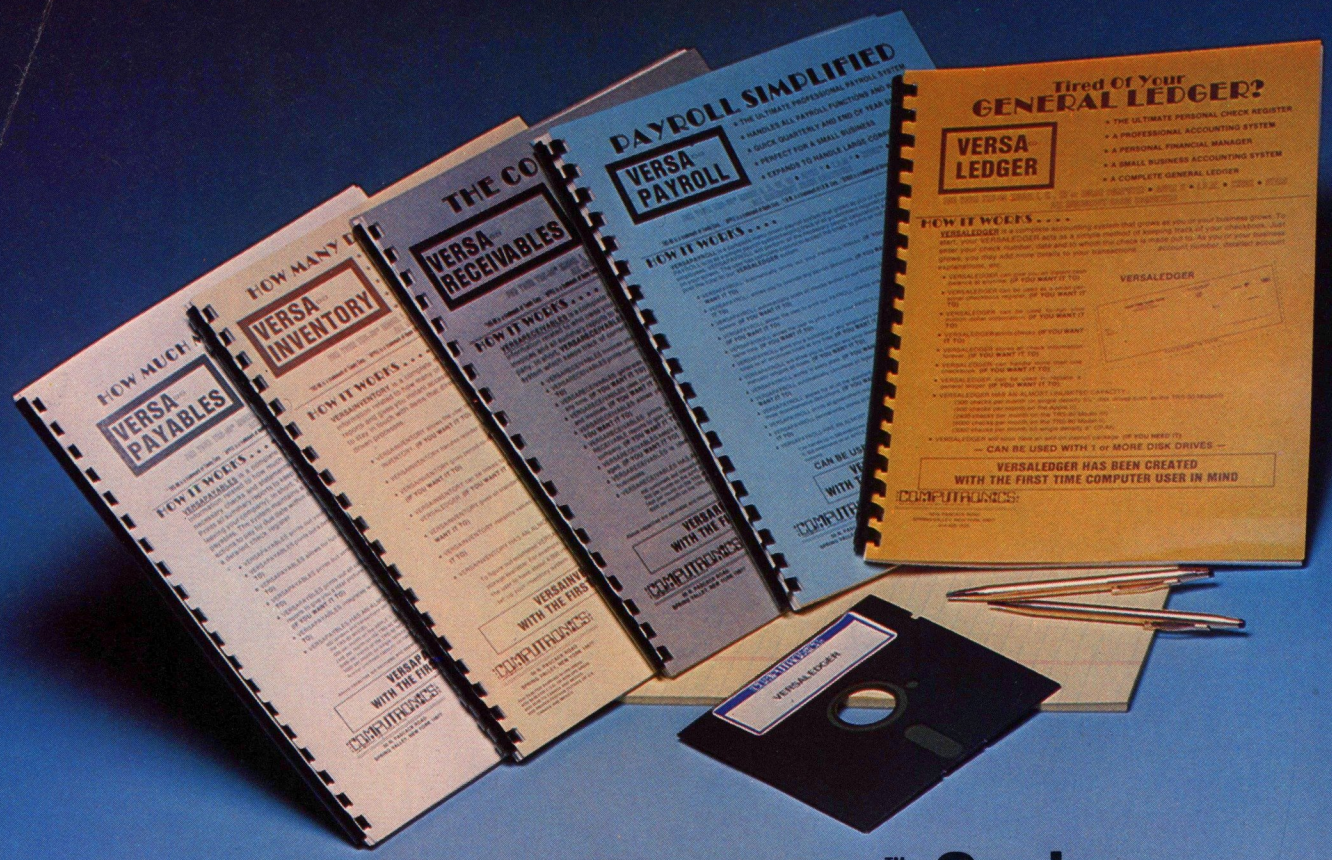

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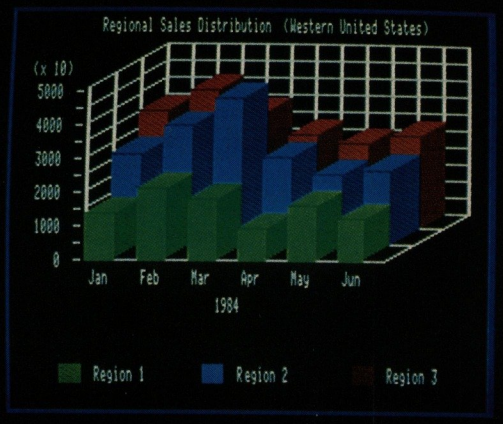

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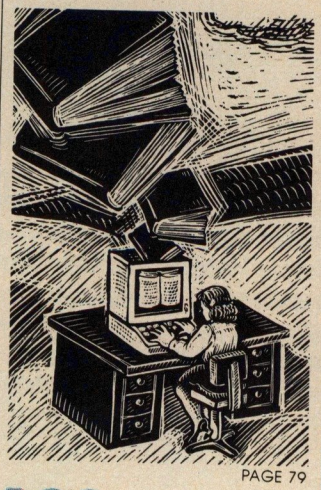
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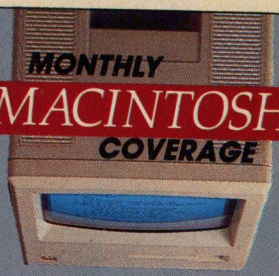

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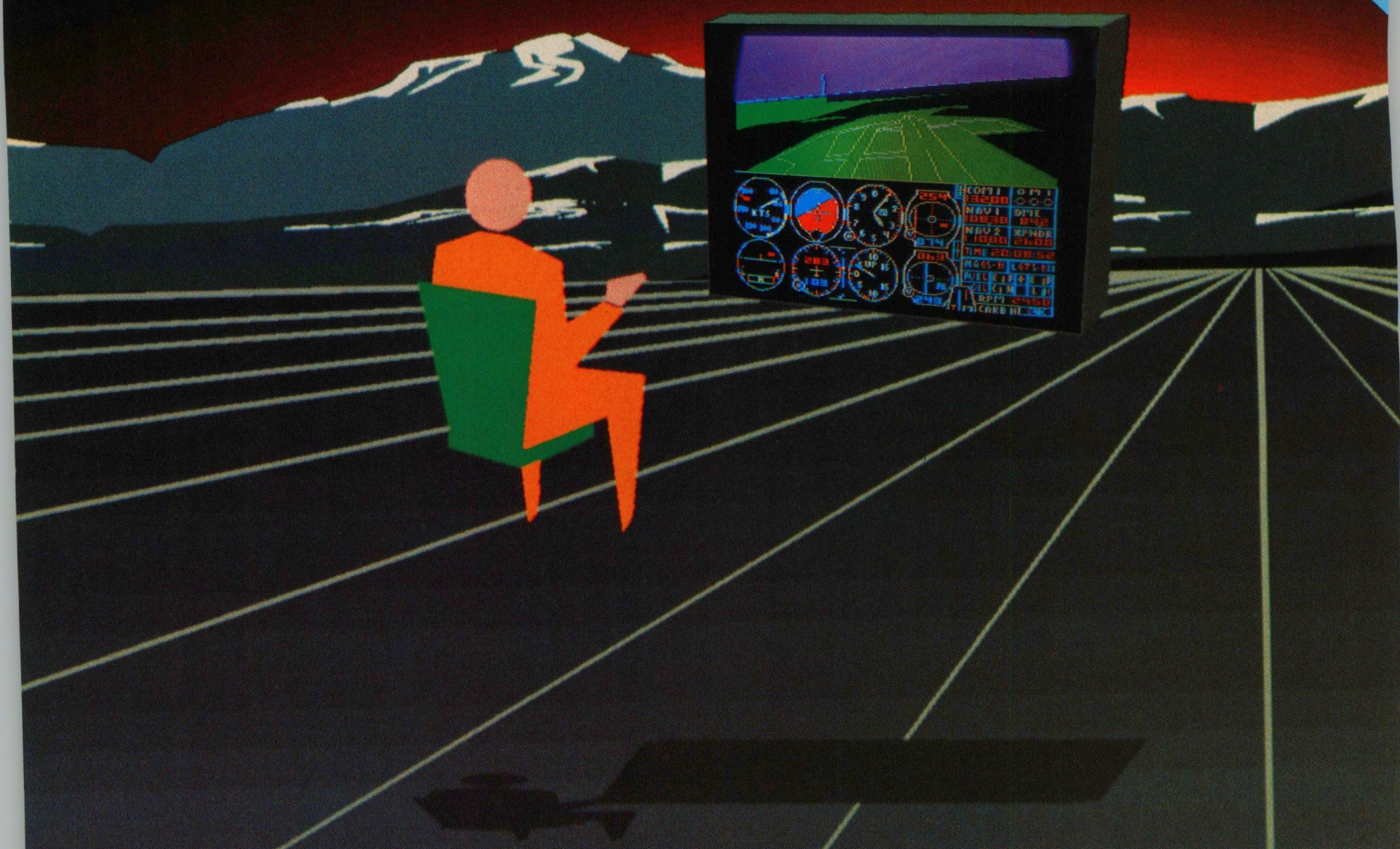
Flight Simulator II

For Apple II, Apple II+, & Apple IIe



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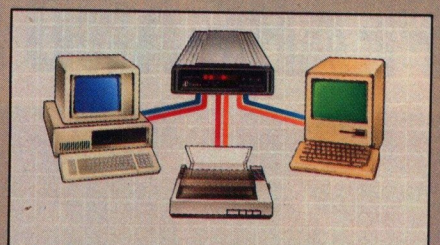

Two computers can share one printer with Transet 1000. Or, you can use Transet 1000 to let two computers communicate with each other.

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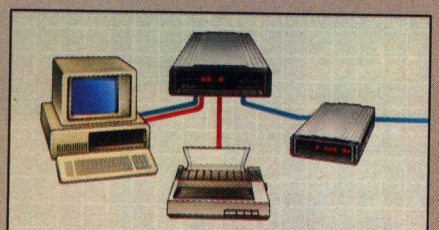

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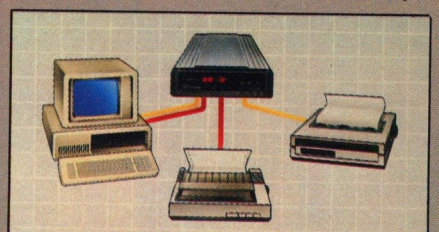

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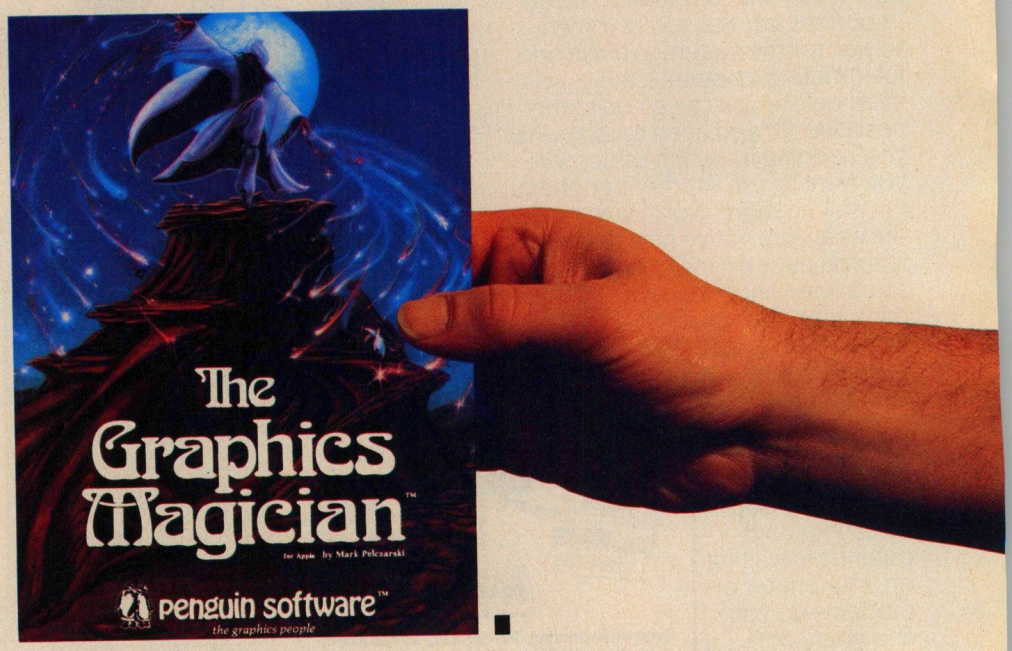

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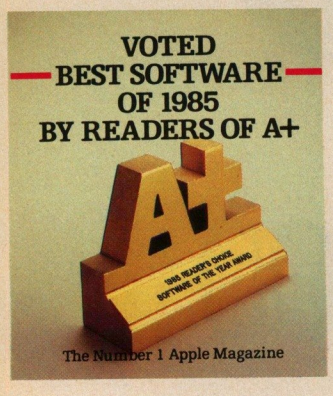

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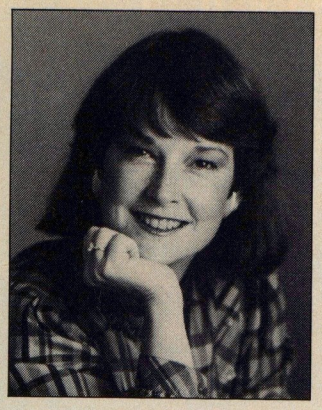

A medley of articles covers ergonomics, the new LaserWriter printer, computer camps, and more

FROM POSTURE TO ProDOS

Have you noticed yourself rubbing your eyes, neck, or back after several hours in front of your computer? If you have—and I dare say that most of us have suffered some form of computer-related fatigue—you should definitely consider rearranging and perhaps even investing further in the furniture you use with your computer.

Our cover story this month, written by Deborah Dietsch, an interior-design specialist who writes for such prestigious magazines as *Architectural Digest*, takes an in-depth look at the particulars of selecting and arranging furniture and lighting so that you minimize fatigue. This article is a must for anyone who uses a computer at the office or at home, even for as little as half an hour a day.

You have probably heard about Apple Computer's fancy new printer, the LaserWriter (see the cover story, "The Macintosh Office," in the March issue of *A+* and "Desktop Publishing" in the May issue). You probably assumed you could use the LaserWriter only with the Macintosh computer, since Apple introduced it at the time of the Macintosh Office announcement. Apple II and Apple III users (as well as Macintosh and Lisa users) will be happy to know that they, too, can use this powerful new printer by learning about Postscript, the programming language that drives the LaserWriter. Since we feel it is important that II and III users not be left out of the excitement and because Macintosh programmers may want to unlock the secrets of the LaserWriter, we begin in this issue of *A+* a four-part Postscript tutorial by Steve Rosenthal that will teach you how to move files from your Apple II or III to the LaserWriter to produce stunning typeset-quality printouts. The tutorial will also show you how to program the LaserWriter for special effects, such as rotation of text and graphics.

We are also continuing our ProDOS tutorial with the second part of the series.

By the time you get this issue, with summer vacation looming on the horizon, you might be thinking about sending your children to a computer camp. Just as with any other camp, you must pick a computer camp carefully in order to provide the experience you have in mind for your children. Vanessa Schnatmeier's article "Choosing the Right Computer Camp" gives you step-by-step guidance to help you evaluate the best computer camp for your kids.

For Macintosh users, we have an exciting group of articles. In her article "The Electronic Index Card," Sharon Aker compares 13 database programs and offers advice on which program is right for you. We also have a review of a time-management program called Front Desk, as well as reviews of MegaFiler, MegaForm, and MegaMerge. All of these products demonstrate that ample professional software is now available for the Macintosh.

Not only is plenty of business software obtainable, but a surprising amount of public-domain software is also available for the Mac. Next month, in the first part of a two-part article, "Penny-Wise Programs," Robert C. Eckhardt will give you a rundown on the different kinds of products that are available and how to get them.

As you can tell, this issue is crammed full of valuable articles, and I haven't mentioned all of them! Happy reading! ✚

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SPEEDEMON UPDATE

Dear *A+*,

I wish to call your attention to the addendum to the excerpt from Charles Rubin's *The Endless Apple* entitled "The Latest Enhancements" (*A+*, March 1985, pages 154–155).

Although we are grateful for being mentioned as a competitor in the "speed-up" war of 65C02 processor boards, we have an update we would like you and your readers to know about. Mr. Rubin states that "if you're worried about power consumption, however, you should also know that the SpeeDemon draws twice the wattage of the Accelerator cards." This assertion is no longer true and hasn't been for some time. The SpeeDemon *did* draw twice the wattage of other cards at 1 amp, but it now draws 650 milliamps. I felt it important to update this issue, since I've had concerned customers calling about their power consumption.

Vicky L. Seavers
Director of Dealer Sales
McT
Santa Monica, CA

DISK DRIVES REVISITED

Dear *A+*,

Wow, was I disappointed in the article entitled "First Aid for Disk Drives" (*A+*, March 1985, pages 169–172). I was hoping that it would help to dispel some of the mystery in which computer-service personnel seem to have shrouded the Apple Disk II. About all the article covered was that you should check for loose cable connectors and how to pry up the multipin IC chips safely.

One possibly valuable clue, however, was that the 9334 (or 74LS259—which is apparently interchangeable with the 9334—the motor-enable and stepper-control circuits), the 74LS05 (the inverter bank) and PROM P6 (or P6A—boot-load routine) were chips on the controller card that were most likely to fail. Unfortunately, you didn't include any symptoms that would identify these failed chips (for instance, what does the "inverter bank" do?).

One nice thing that Apple did when it designed the Apple II computer was to put letters along the side of the board and numbers along the top of the board, thereby helping to identify the locations of chips. For example, the N9334N, mentioned previously, is located at C2. This tip might help your readers locate the chips referenced in the article.

Also, I noted Gayler's excellent book *The Apple II Circuit Description* referenced at the end of the article. I'm sorry to report that this book does *not* cover any peripheral devices such as the Disk II. For those readers wanting circuit schematics, Apple did include the Disk II Interface Card on page 145 and the Disk II Analog Board on page 146 of *The DOS Manual*, which comes with the Apple II system. So far, I've failed to locate a schematic for the small board at the back of the Disk II that includes the multiturn pot used commonly for speed adjustment. I'm hoping that your next disk-drive-repair article (April 1985) will mention that adjustment, as well as the zero-track adjustment. [*Editor's Note: It did. See* A+ *April 1985, pages 159–167.*]

Regarding the software referenced at the end of the article, I've tried Verbatim's Datalife Disk Drive Analyzer on some of my drives (from five different manufacturers), which occasionally seem to be misbehaving, and always it says the drives are "OK." The go/no-go analysis is only marginally helpful. From reading its literature, it appears that the RID disk from Dymek may be more helpful, but so far, I haven't risked the $35 on it.

One encouraging comment is that the photographic illustrations in your article were great—clear and legible.

Chester T. Rice
Kentfield, CA

'UNDOCUMENTED'

Dear *A+*,

In the February 1985 issue of *A+* (page 132), a MacTip from Paul Papanek Jr. dealt with MacTerminal's "undocumented features." In all fairness, I should point out that these "undocumented features" are merely the standard ASCII editing commands. To add to his list, ⌘-S means *send*.

Papanek also mentioned that the cursor changes to another shape when you press the Option key. He noted that it did not do anything when he was online. The explanation is that that cursor is the cursor emulation of the DEC VT-100 terminal. Although the Option key will change the cursor in the TTY mode of MacTerminal, it is functional only when MacTerminal is emulating a VT-100.

If you try to use the Option-key cursor in the TTV mode, you will get interference on the communications line. The cursor allows for text editing. When you hold down the Option key, just position the new-shaped cursor where you want to edit and click the mouse button. This action causes the old underline-type cursor to scurry to the point where you clicked the mouse. Furthermore, in VT-100 emulation, the Enter key acts as the Break key. You use ⌘ 6 as the Home key, and ⌘[is Escape.

Daniel Lewis Paul
Denver, CO

RENDEZVOUS WITH RAMA

Dear *A+*,

If David Gerrold had been using a joystick when he was attempting to dock the *Endeavor* on Rama ("Breathtaking Graphics, but Frustrating Play," *A+*, April 1985, page 180), he would have been able to get past the two docking screens. I have managed to get past the second screen four times by maneuvering the *Endeavor* down the radiating tubes at the north end of Rama, al-

though I am not sure at what point the program decides that I have landed.

By the way, the software has a glitch that will allow you to get around the docking screens and land. After booting the game, go directly to the control room and then type ACTION. Select Dragonfly, which is an easier set of two arcade-type games. Once you have successfully gotten past these "practice" screens, the program will not only put you back into the control room (which it should do), but will also inform you that you have successfully docked the *Endeavor* on Rama (which it should not do).

Even though you will have "cheated," at least this finagling allows you to get inside the mysterious extraterrestrial artifact.

John P. Monteverdi
Oakland, CA

CREDIT WHERE IT'S DUE

Dear *A+*,

I must disagree with a point Roberta Schwartz makes in her review of Brøderbund's Dazzle Draw (*A+*, March 1985, pages 58–62). She contends that Brøderbund is out of line for expecting credit when its program is used to create artwork in other software packages.

Perhaps she hasn't noticed a line that appears in the closing credits of almost every motion picture made in the world: "Filmed in Panavision." Without this line, the producers would be unable to use what has become the standard format.

At the end of most game shows and talk shows you can find a credit telling you what company provided the host's wardrobe. This is called giving credit where credit is due.

If Dazzle Draw is as good a program as Schwartz says, the folks at Brøderbund are well within their rights; if they wanted to be sticklers, they could charge a licensing fee, but I imagine they are realistic enough to know that such demands are often overlooked in this industry.

Jeff Truelsen
Ithaca, NY

BRØDERBUND CORRECTIONS

Dear *A+*,

I want to point out an inaccuracy in your review of our product Championship Lode Runner, published in the February 1985 issue of *A+*. Your statement that the *Hint Book* is included with the program has already prompted many calls from customers who didn't get a copy with their program. The *Hint Book* is, in fact, sold as a separate product, retailing at $9.95.

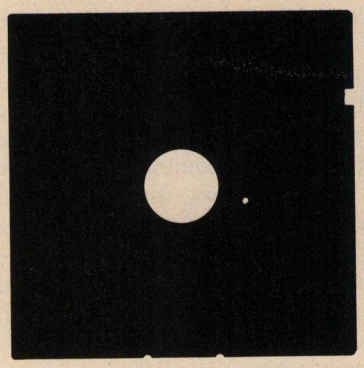
I also might comment that the Hint Book is not a solution book. It provides an approach that will work to solve each level rather than an absolute solution.

Another mistake that I would like to correct appeared in the review of our program Dazzle Draw (March 1985, pages 58–62). The actual price of the product is $59.95, not $49.95 as stated in the article.

Marsha Goodman
Marketing Coordinator
Brøderbund Software
San Rafael, CA

STORY MAKER PRICE CORRECTION

The price for Scholastic, Inc.'s Story Maker program was listed incorrectly in the April, 1985 issue of *A+* ("Software for Budding Young Writers," page 38). The correct price for the product is $39.95.



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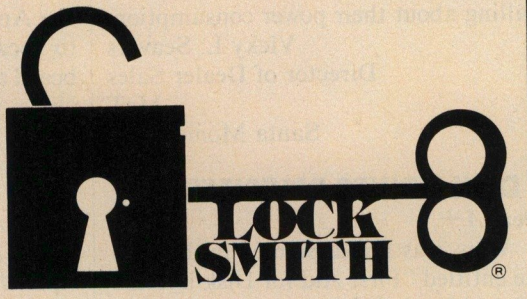

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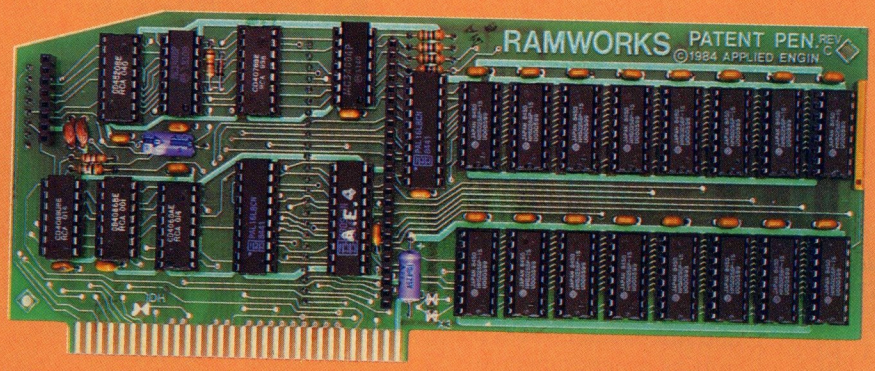

"In an industry as dynamic as the personal computer industry, it's inevitable that computers will be built with more and more memory. It's equally inevitable that newer, faster, more powerful software will be written to take advantage of that extra memory. Where does that leave you?"

Direct quote from new Apple IIe owners manual.

If you just want to play games with your Apple or write small BASIC programs, 128K is probably enough memory. But if you're using your Apple IIe for a serious purpose, you're going to need more memory. Applied Engineering has the answer: RAMWORKS. With RAMWORKS, you won't have to split files into several small pieces just to fit them into memory. You'll have ALL your data on line ALL the time.

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A 64K RAMWORKS will ADD 46K to whatever you already have on your available desktop memory, a 128K RAMWORKS will ADD 91K, a 256K RAMWORKS will ADD 182K, a 512K RAMWORKS will ADD 364K and a 1 meg RAMWORKS will give you nearly an 800K DESKTOP. But RAMWORKS does more than just increase the desktop memory (as if that weren't enough). With RAMWORKS, Appleworks will be able to run up to 20 times faster. And now only RAMWORKS does this all automatically with no need for any optional software.

When you have a RAMWORKS card, you can have enough memory so that the entire Appleworks program will be loaded into the computer. This greatly increases the speed at which Appleworks operates because the disk drive operates at 300 RPM. RAMWORKS operates at the speed of light!

RAMWORKS just plugs in and clear instructions show how to plug more memory chips into RAMWORKS as your needs increase.

For only $129 an RGB option can be added to RAMWORKS to give you double high resolution color graphics and sharp 80 column text on any Apple compatible RGB monitor. The RGB option does not take up another slot, but rather it plugs into RAMWORKS. You can order the RGB option with your RAMWORKS or add it on at a later date.

RAMWORKS has taken the "waiting" out of computing. Floppies and hard disks are OK for long term storage. But they fall far short as on line storage. If you are using high level languages, spelling checkers, spread sheets, word processors, databases and other disk intensive software, RAMWORKS will save you time and make you more productive.

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Applied Engineering is passing along the cost savings that we've acquired through automated production. We're lowering the price on the more popular sizes of RAMWORKS, so now there's no reason to wait to increase your productivity. You'll be amazed at what you can do!

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- ☑ Accelerates Appleworks
- ☑ 100% Compatible with All IIe software
- ☑ RAM Disk software available, compatible with PRO-DOS, DOS 3.3, and PASCAL ($29.00)
- ☑ RAM Disk available for CP/M ($29.00)
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NEWS+

BY FREDERIC E. DAVIS

PCjr BITES THE DUST

IBM surprised the industry last March when it suddenly dropped the PCjr from its product lineup. Industry speculation is that IBM made the decision last year and heavily discounted the PCjr last Christmas in order to clear out existing inventory. Now buyers of the PCjr are wondering if they really got a bargain at all.

I always felt that IBM was the wrong company from which to buy a home computer. IBM is set up to support business users, not home users. With the demise of PCjr, the Apple II remains as the only long-term survivor in the home marketplace. The PCjr's lack of success also goes to show that people didn't buy PCjr's for home because they had a PC at work; instead, they bought Apple IIs for home because their kids used them at school.

HYBRID PROGRAMS

Apple is currently developing a hybrid programming environment for the 512K Mac that supports Pascal, C, and assembly language. This hybrid will make these different languages compatible at the object-file and link-format levels, permitting programmers to mix and match code segments from the three languages.

The as-yet-unannounced product will offer a full set of tools such as editors, debuggers, and UNIX-like utilities and is tentatively scheduled for release this fall. Innovative and flexible programming environments such as this should help spur the development of sophisticated new Macintosh software.

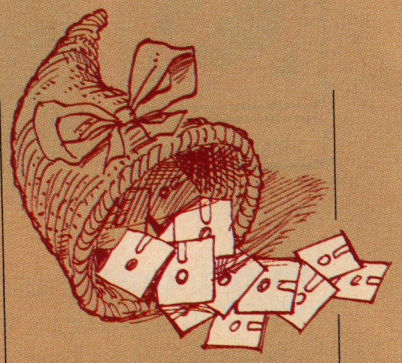
APPLE RIPE FOR PLUCKING?

Is Apple Computer, Inc., ripe for a corporate takeover? That's what several industry insiders are now speculating. Apple is in good financial shape, since it has some cash reserves and no long-term debt. Now that corporate takeovers and buy outs are becoming commonplace, Apple is considered to be an attractive property, since many believe that Apple's stock is undervalued.

Who might be interested in Apple? Well, two names that have come up in recent speculation are AT&T and GE. AT&T has reportedly expressed a keen interest in Apple, and the alliance could be excellent for both companies. AT&T's sales were more than $53 billion in 1984, compared to IBM's $45.9 billion and Apple's comparatively tiny $1.8 billion. The other potential suitor is General Electric, with 1984 sales of $27.9 billion. GE already has close ties to Apple, in that it sells Apples to its corporate clients and underwrites the Apple credit card.

One of the major obstacles to a buy out is that Steve Jobs controls a huge block of Apple stock. Unless CEO John Sculley can convince Jobs to sell a significant amount of stock, no buy out or takeover is likely.

WILLIAM CONE



PFS: BUNDLE

Software Publishing has made its fortune on the PFS: family of software. The PFS: products have been so popular that IBM decided to buy the rights to the series and now offers these products under the IBM Assistant series label.

Since IBM has been doing a lot of marketing for the Assistant series, Software Publishing decided to do a marketing promotion for its PFS: series on the Apple II. The result is the Best of PFS promotion, which started this May and ends July 31. The Best of PFS is a bundle that includes PFS:File, PFS:Report, PFS:Write, and a coupon good for the as-yet-unavailable PFS:Plan. The bundle has a suggested retail price of $250, which is an excellent savings.

HP TARGETS APPLE MARKET

A recent market-research study conducted by SRI International in Menlo Park, California, predicts that Hewlett-Packard will increase its share of the printer market sixfold in the next six months, giving HP an estimated 27% market share. In order to broaden the apple of its product line,

HP plans to introduce new methods of using its price-competitive Thinkjet and Laserjet printers with the Macintosh. We're looking into how these printers can be used with the Apple II series. We'll keep you posted on these developments.

LOTUS SINGS THE BLUES

When Lotus announced Jazz last fall, the company promised the program would be ready by March of this year. When the March deadline arrived, Lotus announced that the program

would not be ready until late May. That news alone sent Apple stock into a nosedive.

Well, by the time this magazine is in print, we should know whether or not Lotus has made good on its May delivery date. We're all hoping that the product will be on dealers' shelves soon, since many business customers are reserving judgment about the Mac until Jazz is out. This wait-and-see attitude has hurt sales of the Mac already and has been fatal to other products in the past.

DEVELOPERS' NETWORK

Delphi, an on-line information service, has started a special-interest group (SIG) for Macintosh developers that promises to be a major way of keeping up to date on Mac technical happenings. The sysop of the SIG will be former *A+* author and consulting editor Dennis Brothers, whose MacTEP terminal program first appeared in print here in *A+*. For further information contact Delphi, 3 Blackstone Street, Cambridge, MA 02139; (800) 544-4005 or, in MA (617) 491-3391.

A+ ON-LINE

We've had quite a few people ask us whether we offer an index to *A+*. Although we do not publish a printed index in the magazine, our sister company Information Access Company provides two on-line indexes. They are available for searching on-line via Dialog, which is available at most libraries and universities.

The Magazine Index (Dialog file 47) contains an index of titles, authors, illustrations, and key words and is available on Knowledge Index as well as Dialog. The Magazine ASAP database (Dialog file 647) is better for more specific searches since it contains the full text of all *A+* articles, but it is available only on Dialog. Contact Dialog Information Services, 3460 Hillview Avenue, Palo Alto, CA 94304; (800) 227-1927 or in CA (800) 982-5838.

CHRIS SPOLLEN

EXCEL

When it comes to the Macintosh, Microsoft really does mean business. Microsoft's first integrated-software program is Excel, a superlative spreadsheet/graphics/database program for the Macintosh that packs a lot more wallop for number crunching than do either Lotus 1-2-3 or Jazz.

Based on what I've seen, Excel offers the most powerful electronic worksheet of any personal-computer software. It can solve advanced programs such as those involving multiple variables and multiple interactive worksheets. Each worksheet can have a matrix of up to 256 columns by 16,384 rows and includes an on-sheet database with complete querying and sorting capabilities.

There's more. The graphics features of Excel offer everything that Microsoft Chart has, and then some. Excel also allows you to create powerful macros for automating procedures and creating custom mathematical functions, and it offers two-way file transfers with Multiplan, Chart, Lotus 1-2-3, and SYLK files.

The Mac won't make it into offices unless it can offer performance that is not available on the IBM PC series. Excel looks like the best software for number processing available for any personal computer. This type of high-powered software for the Mac should help make businesspeople more aware of the significant role the Macintosh can play in the office.

For more information about Excel, see "Pipeline" in this issue. ✚

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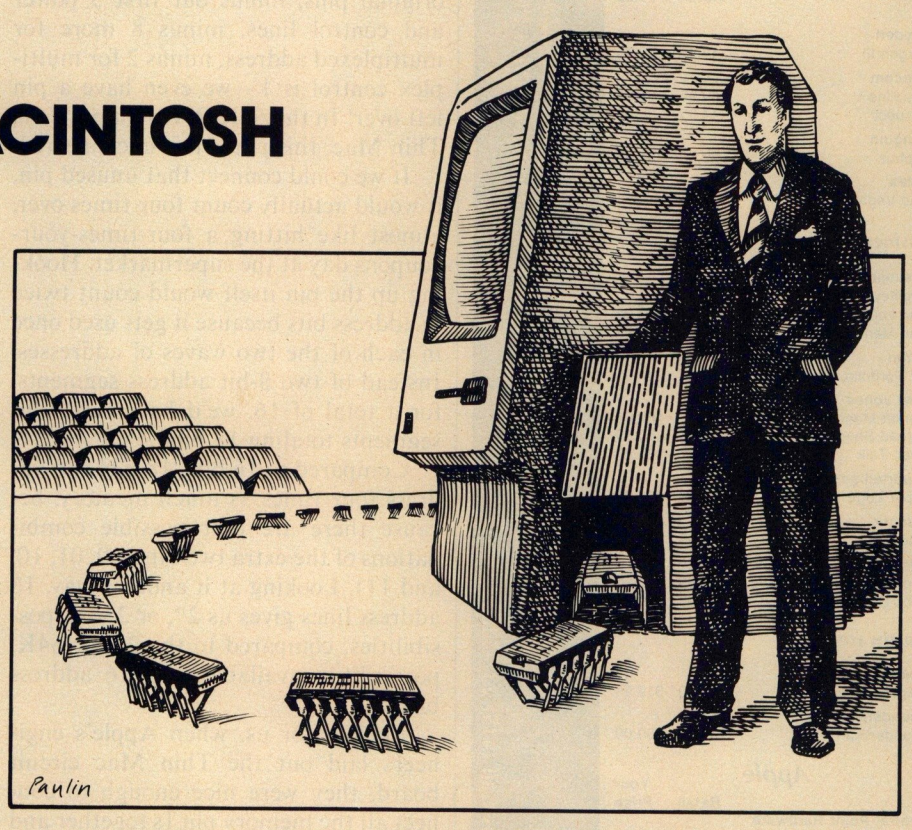
CIRCLE 156 ON READER SERVICE CARD

THOUGHTWARE
BY STEVE ROSENTHAL
The ins and outs of upgrades

PRECIOUS MACINTOSH MEMORIES



Every 128K Macintosh has the potential to grow up into a full-fledged 512K machine. You may, by now, have seen a slew of ads from companies that offer to upgrade your 128K Mac to Fat Mac status for far less than the official Apple price. Are the upgrades any good? What do these folks do when they poke around in the entrails of what may be your favorite computer?

The basic difference between a 128K (Thin) Mac and its 512K (Fat) brother is the type of memory chip they use. A Thin Mac uses 16 chips that each store 65,536 individual bits (64K × 1 chips). The Fat Mac also uses 16 chips, but each of these can store 262,144 bits (256K). Unfortunately, although the chips are quite similar, you can't just unplug the 64K chips and substitute the 256K versions.

Aside from the cruel fact that the 64K chips are soldered directly to the circuit board, you face one other major obstacle in upgrading to more memory: It takes a more precise address to specify one of 256K memory locations than it does to pick from among 64K possibilities. Upgrading your Mac, therefore, means both substituting memory chips and bringing in the additional address information. The theory is going to take a bit of arithmetic to explain, but bear with me—everything is below 20 or an even power of 2, and you don't have to catch all the details to make sense of the general pattern.

In the Thin Mac, 16 bits are necessary to specify an address. If you happen to have memorized your powers of 2, you might have recognized that 16 bits gives you 2^{16} (65,536) possibilities, which we call 64K (a binary K, or thousand, is 1024). Using 16 address bits, we can specify any of the 64K data bits in a 64K × 1 RAM chip.

The 68000 microprocessor chip in the Macintosh uses a 16-bit data path, meaning that in each read or write operation it can transfer 16 bits or 2 bytes. So, with 64K possible addresses and up to 2 bytes transferred at each address, the Thin Mac allows you to work with 128K of RAM.

What do these folks do when they poke around in the entrails of your favorite computer?

If you looked at the circuit board inside a Thin Mac, you'd see 16 of the 64K chips arranged in a neat four-by-four rectangle (the memory chips are oblong, so you don't quite get a square). The chips are standard dynamic-memory chips, with 16 pins on each.

Each chip requires one line for power and one for ground. One line tells the chip whether to accept data to store away or whether to read data back out. Data comes in on one line and leaves on another. So far, that's 5 lines, with 16 pins available in all. We did say that we needed 16 lines just to specify the address of which of the 64K memory cells we wanted the chip to read from or write to, though. Obviously, we have a problem.

Getting 16 address lines on 13 pins is a standard challenge in computer design, with a set of standard solutions. The solution used in the Macintosh is called *multiplexing*. The 16-bit set of address information goes out as two waves of 8 bits each, instead of as a single 16-bit value. Thus only 8 pins are necessary for the 16 address lines, with 2 more pins telling the chip when each wave of 8 address bits is available.

The 68000 itself doesn't use this two-wave multiplexed address, because it has enough pins on its 64-pin package

DOUG PAULIN

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Macintosh

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CIRCLE 125 ON READER SERVICE CARD

for a full 24 bits of address. To get the addresses from the full-width (or 16-bit) form the 68000 uses to the two-part (or multiplexed) form the memory chips use, the Mac employs a standard interface chip called a multiplexer. In fact, a standard Thin Mac has four multiplexer chips, each of which handles 4 of the 16 address bits.

One to Grow On

Going back to the memory chips, 16 original pins, minus our first 5 power and control lines, minus 8 more for multiplexed address, minus 2 for multiplex control is 1—we even have a pin left over! In the 64K RAM chips in the Thin Mac, this pin is left unconnected.

If we could connect that unused pin, it would actually count four times over, almost like hitting a four-times-your-coupons day at the supermarket. Hooking up the pin itself would count twice in address bits because it gets used once in each of the two waves of addresses. Instead of two 8-bit address segments, for a total of 16, we'd have two 9-bit segments totaling 18 bits.

Compared to 16 bits, 18 bits can address four times as much memory, because there are four possible combinations of the extra two bits (00, 01, 10, and 11). Looking at it another way, 18 address lines gives us 2^{18}, or 256K, possibilities, compared to the 2^{16}, or 64K, possibilities available with 16 address bits.

Luckily for us, when Apple's engineers laid out the Thin Mac circuit board, they were nice enough to connect all the memory pin 1s together and to bring the extra two address lines from the 68000 to a convenient spot on the board.

To upgrade to a Fat Mac, what we have to do is change the memory chips, connect up the wires, and supply an extra multiplexer chip. On the original Thin Mac board, we have to add a tiny circuit board for the extra multiplexer chip, or piggyback the chip over an existing chip. The board in Apple's 512K Mac has a slot for the multiplexer.

If we add the multiplexer and connect everything else up correctly, the result is logically identical to a true 512K Fat Mac. In fact, some Apple dealers tell me, the result may be even better—Apple's official upgrades occasionally cause problems for the power supply, whereas installers report no such problems with the unofficial route. Conceptually, then, getting the official Apple upgrade or upgrading a Thin Mac gets you the same results. The process is quite different, though.

If you take your Mac to an official Apple dealer for an upgrade, the dealer will open up your Mac case, take out the main circuit board, drop in a new 512K board, and either sell the old board back to Apple, save it to repair Thin Macs, or sell it to a true hacker. You have a Mac that might last slightly longer than it would have without the upgrade (you have all new components on the digital board), and you're out Apple's board price plus dealer installation.

If, on the other hand, you take your Mac to a firm that does an unofficial upgrade, the cost will be less, but the process is a little more involved. You may have to leave your Macintosh overnight, because your upgrader will have a lot of fine soldering work to do.

▶ It's your machine, and you're free to do what you want to it if you don't expect Apple to fix any damage afterwards.

According to Apple's Renée Rodrigue, the company reminds you that opening the case of a recently purchased Mac for any purpose voids the remainder of the warranty. Other than that, she says, Apple feels it's your machine, and you're free to do what you want to it if you don't expect Apple to fix any damage afterwards (you can buy a replacement main board from an Apple dealer, but you may not get the trade-in ["core charge"] back for a damaged or altered board). So be sure you trust your upgrader and check out what will happen if something goes wrong before he or she breaks that seal.

After opening the case, your trusty technician will remove the existing memory chips. Remember, those chips are soldered into place, and the circuit board is a four-layer model with tiny lines and pads, so this operation requires a high degree of skill. Conservative practice dictates sacrificing the old chips by cutting them away from their pins to simplify removing each pin individually, but some upgraders are equipped to remove chips in good enough shape to sell them as used but usable.

Many upgrade installers solder sockets into the chip positions that have just been vacated, but others solder the new chips directly into the board. The argu-

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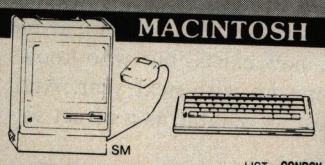

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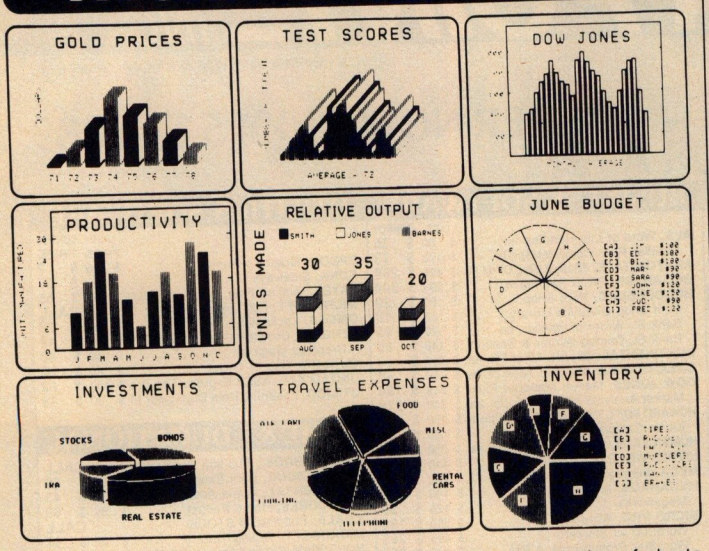

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ment from the nonsocket side goes like this: You can't expect to upgrade the memory chips again beyond the 256K level, because the family of memory chips at 256K has no more unused pins; chips are more reliable when soldered in (that's why Apple did it originally); and the upgrader who wants to guarantee the work also needs to know that you won't be able to switch chips.

The prosocket side retorts that even memory chips fail in the field, and you don't want to have to keep soldering and desoldering your board. It's true that no compatible upgrade family beyond 256K now exists, but who knows what the IC makers may come up with next year. And, anyway, sockets are now almost as reliable as a direct soldered connection.

Whichever way it's done, after the chips are installed by direct soldering or in sockets, your installer adds the multi-

Several electronics enthusiasts that I spoke with said they had done their own upgrades and found it an easy process.

plexer chip, cuts a single trace on the printed circuit board, wires up fewer than a dozen connections to the added chip, and tests the result. If everything is set up correctly, all the supplies are available, and the phone doesn't have to be answered, the process can take as little as an hour or two.

If the upgrade process is so easy, should you just shop around for the lowest price? Not necessarily, since whoever does the job will be messing with the circuit board of your Macintosh.

Chris Griffen, whose Centa Systems in Agoura Hills, California, was one of the first to offer a commercial upgrade service, says that careful work habits are what make an upgrade successful. His firm has done well over a hundred conversions and hasn't yet lost a board. The upgrade can be done more cheaply than what he charges, he says, but an installer has to make enough money to be there if you ever need your Mac repaired. Like most upgrade firms, his offers a 90-day warranty on both the memory and the main board itself.

Similarly, Steve Orme from Berkeley Computer Systems in Berkeley, California, says that any installation service has to balance price against the amount of care and the warranty it offers. His store, which does both a retail and wholesale upgrade business, also warranties the complete main board for 90 days after upgrading a Mac to 512K status. In addition, he says, you can expect his firm to be there in the years to come if you ever need service.

On the other hand, several electronics enthusiasts that I spoke with said they had done their own upgrades and found it an easy process. The hardest part, providing you're handy with a fine-tip soldering iron, is opening up the Macintosh case.

If you want to try the upgrade yourself, don't rely on this necessarily general description. You can find a step-by-step description of the procedure in the MAUG SIG (the Apple special-interest group) on CompuServe or in the January 1985 issue of *Dr. Dobbs Journal* ($3.50 by mail from M&T Publishing, 2664 Embarcadero Way, Palo Alto, CA 94303). See also "The Mac According to Hogan" in this issue for some extra tips. Keep a steady hand on that soldering iron, and watch out for static. ✚

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CIRCLE 330 ON READER SERVICE CARD

ERGONOMICS

▶ APPLEWORDS
BY STEVE ROSENTHAL

A short glossary of terms for use with 'Ergo, Ergonomics,' page 25

AMBER SCREEN
A monochrome (one-color) monitor screen that shows text and graphics as amber and black. Some people insist that amber is easier on the eyes than black and white or green, and amber monitors are very popular in Europe. Controlled studies, however, have not found a difference in either productivity or eyestrain between similar-quality amber and green monitors.

ANTIGLARE SCREEN
A CRT screen that has been treated to reduce the amount of light reflected off the front of the glass. Common treatment techniques include etching (slightly roughening) the surface, coating it with a thin optical filter, and placing a fine nylon-mesh net in front of the screen.

CIRCULAR POLARIZER
A type of filter that reduces the amount of light and glare reflected from a CRT screen. The polarizer keeps light that has passed through the filter from the outside—and been reflected from the screen—from passing back out, but it allows most of the light from the phosphor inside the CRT to pass through. You can add a polarizer to most Apple monitors.

CONTRAST RATIO
The factor by which the lightest part of a display is brighter than the darkest. Too large a contrast ratio makes the screen seem stark, and too little contrast makes it look flat and hard to read. Large LCDs, such as the 80-column display for the Apple IIc, have much lower contrast ratios than do CRTs, which makes the LCDs harder to read.

DETACHED KEYBOARD
A keyboard that connects to the computer or terminal by a cord, rather than being built into a larger unit. Most ergonomics experts say a detached keyboard is better for long sessions because it allows you to position the keyboard where you want it and to change your posture every so often. In the Apple lineup, only the Macintosh comes with a detached keyboard, but you can buy add-on external keyboards for the II, II Plus, and IIe.

DIN 4549
The German standard for office furniture and work spaces. It is widely cited as an example of ergonomic requirements. Among other provisions, the standard calls for work spaces containing terminals or computers to have work surfaces that are 72 cm (29 inches) above the floor, at least 80 cm (32 inches) deep, and 160 cm (64 inches) wide. Legroom must be at least 65 cm (26 inches) high and wide, and chairs must be adjustable. Each workstation must have at least 8 square meters (about 26 square feet) of floor area or 12 square meters (about 40 square feet) if it is in an open area. Keyboard thickness must be not more than 30 mm (about 1 inch), and there must be 5 to 10 cm (about 2 to 4 inches) of room in front of the keyboard for a wrist rest.

ENVIRONMENTAL LIGHTING
The general light level in the workplace. Especially in offices where people are using computers, the light level should be diffuse and subdued, with more light focused where needed. Most authorities recommend 400 to 500 lux (equal to 30 to 40 footcandles—see *Lumen* entry).

ERGONOMICS
The study of the interaction between people and their work, particularly their tools and workplaces. *Ergonomic* is a coined word, meaning the science of work (ergon).

ETCHED
Applied to the faceplate or screen of a CRT, a slight roughening with a faint pattern of dots or lines. The roughening causes only a small amount of blurring of the light coming out, but it significantly reduces the reflection of light from the outside coming off the glass. Apple monitors have etched faceplates.

FLICKER
As applied to video images, a regular pulsation in brightness of the entire picture or a part of it. Brightness flicker is the pulsation in large areas at high brightness. Interline flicker refers to the small sparkles that show around the edges of objects. You can reduce flicker by increasing the field rate (the speed at which images are shown), by reducing brightness, or by using a longer-persistence phosphor.

LOW-PROFILE KEYBOARD
A keyboard that rests close to the work surface, particularly one meeting the German DIN standards. These standards call for a home row not more than 30 mm (1.2 inches) high, with a 5-to-15-degree keyboard slope (12 degrees is best). Although Apple keyboards don't meet this standard, you can buy add-ons for the II family that do.

LUMEN
A unit of light intensity. It is the amount of light that passes through a specified angle (1-degree solid angle) from a standard candle. One lumen per square foot is a footcandle; one lumen per square meter is one lux.

MATTE FINISH
A slightly roughened finish that reflects light diffusely. Matte finish on components, such as the housings of monitors or keyboards, can reduce reflection and glare.

MESH
A fine nylon net that you place in front of a video screen to cut reflected glare. Nylon-mesh glare screens are inexpensive, but they are hard to clean and only partially effective.

OPTICAL COATING
A thin chemical layer applied to the surface of a display tube to decrease the reflectance of light from outside back to the viewer.

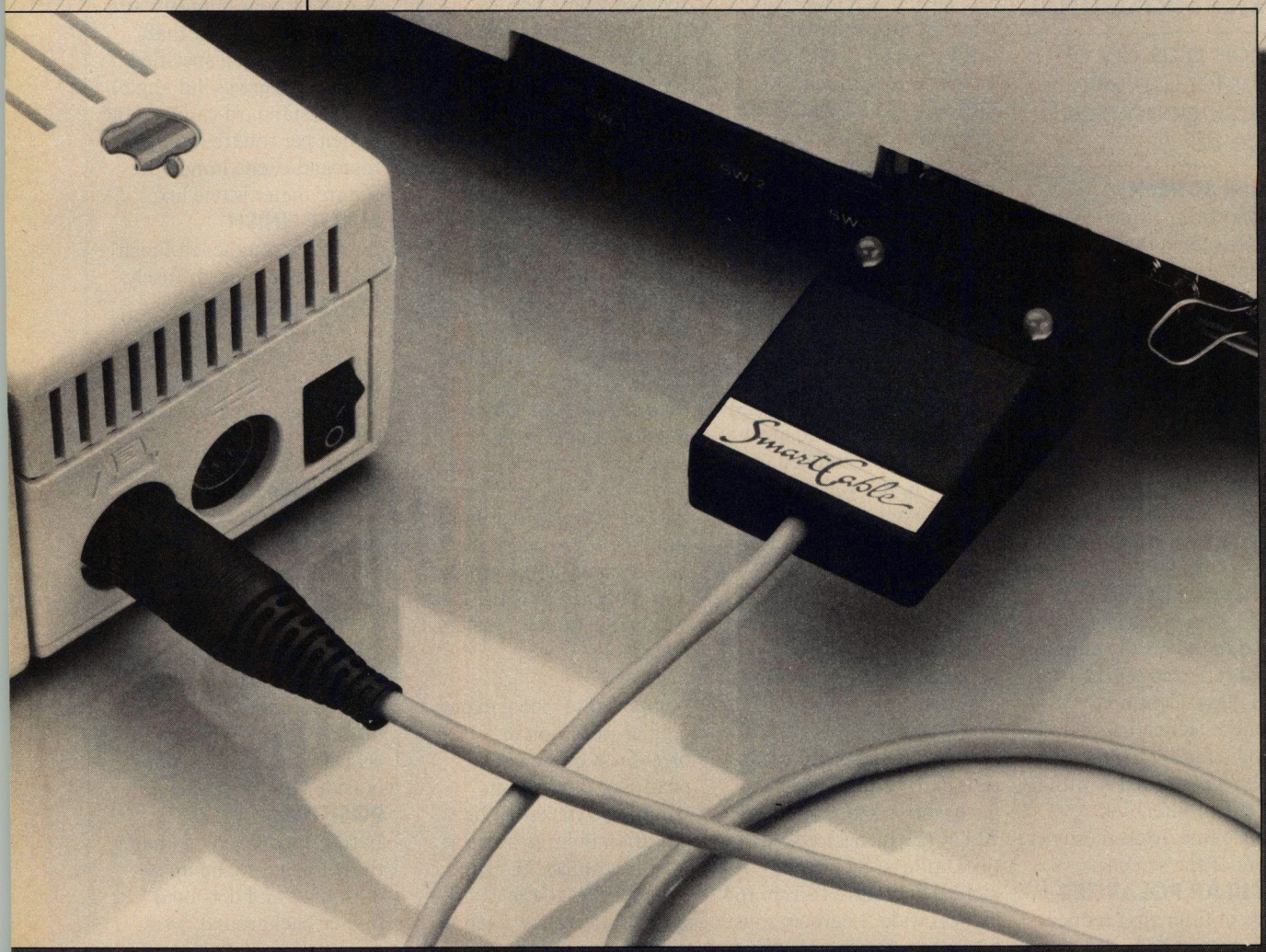
POSITIVE
In referring to screen images, those images made up of dark lines and dots on a lighter background. Most ergonomic standards prefer this mode, but it requires a higher-quality display to prevent visible flicker.

SCULPTURED KEYS
On a keyboard, the concave key tops that allow for secure finger positioning. The term is sometimes used for "dished" keyboards, in which the axes of the key movements are tilted slightly toward the middle row.

WATERFALL EDGE
On a chair, a rounded front edge that resembles the shape of the top surface of water as it runs off an abrupt edge. This design is said to reduce pressure on the thighs and prevent cutting off of circulation. ✚

APPLE JACKS

The smart solution to Apple IIc serial connections.



The Apple® IIc puts a complete computer system at your fingertips. Until you try to let your ideas out of the IIc box.

That's when you discover you need special adaptors and custom cables to hook up with printers, plotters or modems.

Unless, of course, you get smart. And pick up the SC 809 Smart Cable™ from IQ Technologies. The single-cable solution to your peripheral connection problems.

Just connect one end of the Smart Cable to your IIc and the other to virtually any peripheral. Flick a switch. And it's done! Our ingenious electronics do the rest. Automatically.

And at $49.95,* the Smart Cable is an affordable necessity that even your pocketbook can appreciate.

Ask for it by name at your dealer today. Because connecting with the Smart Cable keeps a good Apple from going bad.

IQ TECHNOLOGIES, INC.

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CIRCLE 335 ON READER SERVICE CARD

BY DEBORAH DIETSCH

Comfort and well-being for computer users

Ergo, ergonomics

If you're like most Apple users, your computer has made word processing, calculations, and even drawing much faster and easier to do. Lately, however, you may have noticed that your back is aching, your eyes have started to burn, and headaches are becoming more frequent. Could it be the flu? Perhaps. More likely, though, all of these symptoms–and more–stem from a poorly designed work space for your computer.

Keystroking an Apple certainly isn't as dangerous as working with radioactive materials, but long-term exposure to uncomfortable furniture, inadequate lighting, and insufficient ventilation can produce a myriad of illnesses, ranging from tendinitis to a reduced ability to distinguish colors.

Concern over these health hazards has led to government-funded research, in this country and abroad, to determine methods of coping with computer-related physical as well as emotional ailments—ranging from thrombophlebitis (blood clots) due to uncomfortable seating to feelings of worker isolation. As a result of growing public concern over these health hazards, more than a dozen states are considering legislation to govern the office use of video-display units. The legislation calls for safeguards such as mandatory eye exams, work rotation, and adjustable desks and chairs.

Studies of computer users point out that a well-designed workplace is critical to worker comfort and safety. A 1983 National Research Council report concludes, "With proper design of VDT display, lighting and work stations . . . VDT work need not cause any unique visual problems."

Enter Ergonomics

Furniture manufacturers have begun to pay more attention to ergonomics—from the Greek, *ergos* (work) and *nomos* (natural laws)—the study of designing the work environment to meet human needs. This behavorial science, also known as "human-factors engineering," had its start during World War II in the design of aircraft controls and pilot seating. During the past two decades, ergonomics has increasingly focused on product design, drawing upon the fields of anatomy, physiology, and psychology.

With the growth of automated work and the white-collar sector, office furniture has become more ergonomic and now includes a variety of products—introduced since the 1970s—that exclusively support the desktop computer. Many of the most advanced designs come from Europe. European manufacturers adhere to strict government regulations, as a result of pressure from strong white-collar unions in countries such as West Germany and Sweden.

American furniture manufacturers have rushed to keep pace with these foreign imports, but this country has no mandatory standards governing design, manufacture, or use of computer-support furniture. Nevertheless, the number of products on the market has never been greater. They range from work surfaces that you can lower or raise up to six inches—with separate surfaces for monitors and keyboards—to chairs that you can angle, tilt, and swivel in almost any direction. Although the market for computer-support furniture has

increased, seven out of ten personal-computer users are not aware that this furniture exists, according to a recent study by the Business Projects Consulting Group, of Centerport, New York.

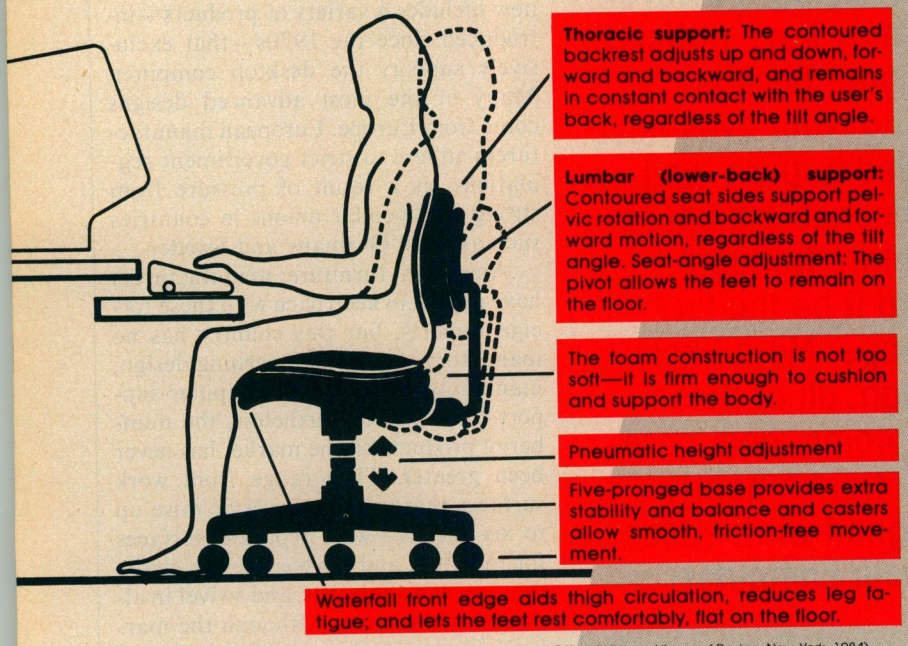
If you want to set up a computerized work area at home, what should you look for? Begin by determining how frequently you use your Apple. As ergonomics expert Jon Ryburg of the Facility Management Institute in Ann Arbor, Michigan, points out, "Ergonomics becomes really important when you spend more than a third of your time at the computer." If you are a constant user, insist on adjustable chairs, work surfaces, and lighting, so that you can adjust your environment to suit your comfort.

Furniture Design

The most rapid advances in ergonomic-furniture design center on the chair, no doubt because back disorders are the number 1 cause of worker absenteeism, affecting 50–80% of the population. A 1980 Louis Harris poll conducted for Steelcase, the largest U.S. manufacturer of furniture, found that 54% of surveyed workers felt that the comfort of their chairs affected their performance. Indeed, the current preoccupation with increased productivity on the part of American management has boosted the development of ergonomic chairs that incorporate a

(continued on page 32)

Diagram of factors that contribute to an ergonomic chair design



Source: William Pulgram and Richard Stonis, *Designing the Automated Office* (Whitney Library of Design, New York, 1984)

FOR SITTING DOWN ON THE JOB, MAKE SURE TO CHOOSE THE PROPER SEAT

Sit Comfortably

When trying out a chair in a store, check that your hips and knees are at right angles and your feet flat on the floor. Remember, though, that few people maintain this posture for long. Research shows that a sitter changes positions every eight to ten minutes. Be sure that you can raise or lower the seat of the chair; experts recommend six to nine inches of movement, from a height of 16 to 22 inches. Many so-called ergonomic chairs now incorporate gas-lift mechanisms, which make seat-height adjustment as easy as pressing a button under the seat.

The front edge of a seat should be rounded or "scrolled" so that it doesn't cut into the back of your legs and restrict blood flow to the thighs and feet. The seat cushion should be lightly padded so that any pressure exerted on the buttocks can be shifted. If too soft, a cushion can cause pressure under the thighs and thrust the hip bones forward. It should be constructed in a material that "breathes," to avoid trapping body heat and perspiration, which can lead to rashes and other infections,

To support the lumbar region of the spine properly, a chair's backrest should fit snugly into the small of your back and tilt backward and forward to accommodate seated movement—at an angle of 80 to 120 degrees, measured from the seat. To adjust to the lower back, the backrest should be able to move up and down two inches or more.

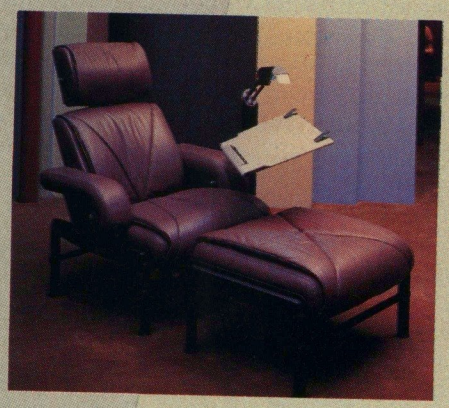
If the chair reclines, it should have a headrest, but it should not push the head forward. Armrests are important in reducing shoulder and arm fatigue. They should be short enough to allow the chair to be drawn up to the work surface and, ideally, be adjustable in height.

To provide stability, the base of the chair should be five-pronged. If a leg should break off from this type of base, the remaining prongs will remain firmly and safely on the floor. For mobility, choose a swivel base on casters.

Checklist

In choosing a chair, consider the following:

1. Is the chair height easily adjustable from the seated position?
2. Does the backrest adequately support the lower-lumbar region of the spine?
3. Does the backrest tilt backward and forward?
4. Can it be adjusted up and down?
5. Do armrests interfere with movement?
6. Does the seat have a rounded front edge?
7. Is the chair adequately padded?
8. Does the chair feature a five-legged base with casters?



Ergonomic chairs currently on the market are adjustable to fit almost any body type. One of the earliest models is the Vertebra chair *(TOP LEFT)*, designed by Emilio Ambasz and Giancarlo Piretti in the early 1970s and available in the U.S. from Krueger (Green Bay, WI). More-recent designs include the Equa chair *(BELOW)*, from Herman Miller, Inc. (Zeeland, MI), which provides continuous lumbar support in its flexible shell and tilts from a pivot mechanism located behind the knees. Just introduced from Knoll International (New York, NY) is new seating designed by Niels Diffrient *(BOTTOM RIGHT)* that can be pneumatically raised or lowered up to 10½ inches and features a movable foot ring on its high-task model. For SunarHauserman (Norwalk, CT), Diffrient has created the ultimate luxury in ergonomics, a leather reclining lounge chair with its own set of computer support tables, lighting, and accessories *(BOTTOM LEFT)*.

ergonomics

BEYOND THE FIXTURE ITSELF, PROPER LIGHTING DEPENDS UPON SPECIFIC ROOM CONDITIONS AND THE PLACEMENT OF YOUR COMPUTER MONITOR.

Let There Be (Glare-Free) Light

Selecting the proper lighting for your computer workstation is a much more difficult task than choosing furniture or accessories, since it is dependent on specific room conditions and the placement of the computer monitor. Not only must the lighting fixture illuminate the screen—a source of light and reflection in itself—but it must also light the keyboard and adjacent paper documents on the desk. In addition, the general level of room lighting should be bright enough to avoid the eyestrain that comes from sharp contrasts between the brightness of the screen and surrounding work areas, yet subdued enough to prevent glare. The American Optometric Association (AOA) recommends screen brightness to three to four times the lighting level of the room.

A way to achieve this balance is to combine the ambient lighting in the room to illuminate the work space indirectly—by shining lights against walls or ceiling with a directly focused, adjustable task lamp on the side of your desk that you use for paperwork. The brightness of the ambient lighting should range from 30 to 50 footcandles (about half the level of brightness in an ordinary, paper-pushing office), according to the AOA, and task lighting should be at a level of 70 footcandles. (A light meter that gives a reading in footcandles is available from General Electric Company.) If you use overhead fixtures to illuminate the computer screen, the incidence of light should be as close to a 45-degree angle as possible on the monitor to avoid veiling reflections and glare.

Filters that fit over the computer screen are another way of reducing glare, but they may diminish contrast, character visibility, and brightness.

Apple Computer, Inc. has improved display visibility on the Macintosh with black characters on a white background. Known as "negative contrast" or "positive presentation," this type of display "reduces the effects of veiling reflections on the screen and may help to reduce problems of adapting to the different luminance levels of the VDT and surrounding objects," according to the National Research Council.

If you work near a window, be sure that your Apple monitor is placed at right angles to it, so that incoming sunlight doesn't shine directly into your eyes or from behind you onto the screen. Stick to neutral tones when choosing colors for your work surface, in order to prevent extreme, competing contrasts in brightness between desktop and display. Matte, rather than shiny, finishes are recommended to prevent light bouncing off the work surface onto the screen.

When choosing light fixtures, try to stay away from fluorescent tubes. Not only do some of these tubes produce an unnatural, greenish-white light, but they also have a tendency to flicker when tubes are wearing out or circuits are faulty. Some researchers believe fluorescent lamps cause long-term health risks, from fatigue to cell mutations.

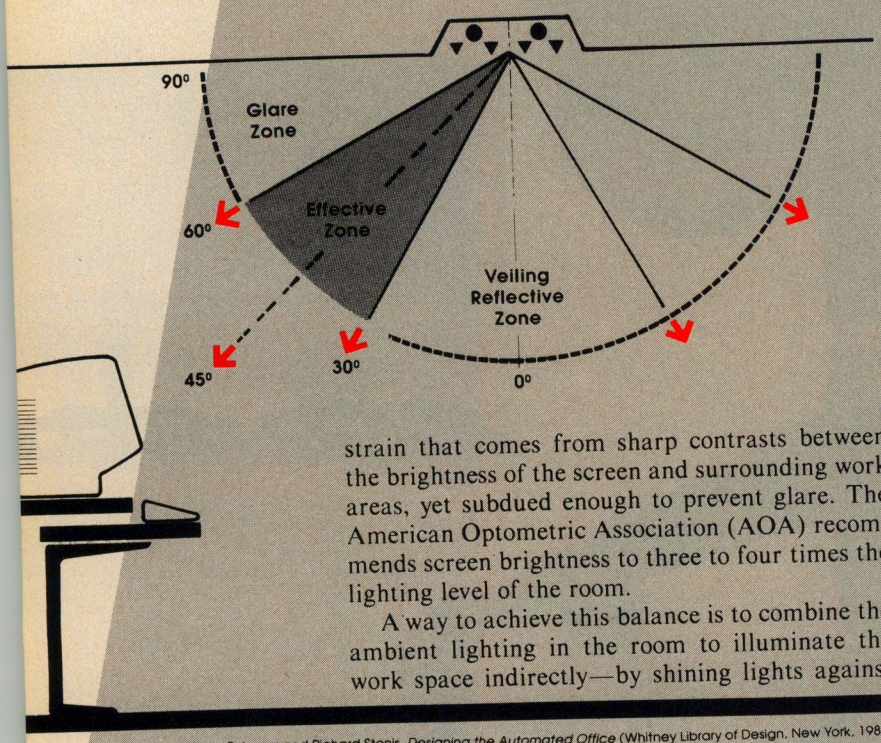
More soothing to the eyes—and to the psyche—are halogen lamps; common incandescent bulbs; and the newly developed Norelco PL13 fluorescent bulb and Vita Lite, manufactured by the Duro-Test Corporation of North Bergen, New Jersey. All of these luminaires emit bright, warm light. Vita Lite produces a mix of broad-spectrum colors that simulate natural daylight, which, according to recent studies, has been found to cure everything from depression to jet lag.

Checklist

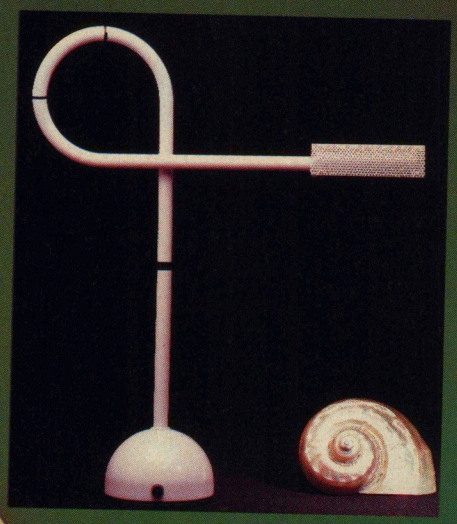
When selecting your lighting, be sure to consider the following points:

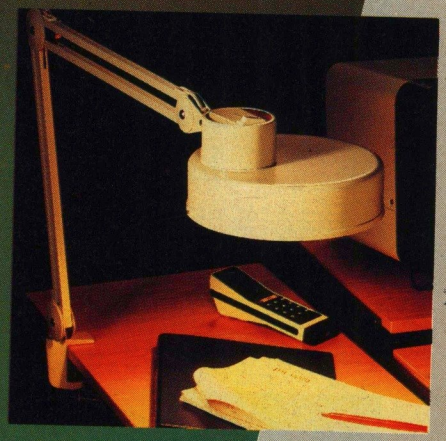
1. Is the level of illumination from the fixture adequate for computer use?
2. Is the light flicker-free?
3. Is the fixture covered with glare shields or an adjustable shade?
4. Can you easily position the lamp to avoid glare and reflections?
5. Are the windows near your work space covered with blinds, curtains, or other means of controlling daylight?

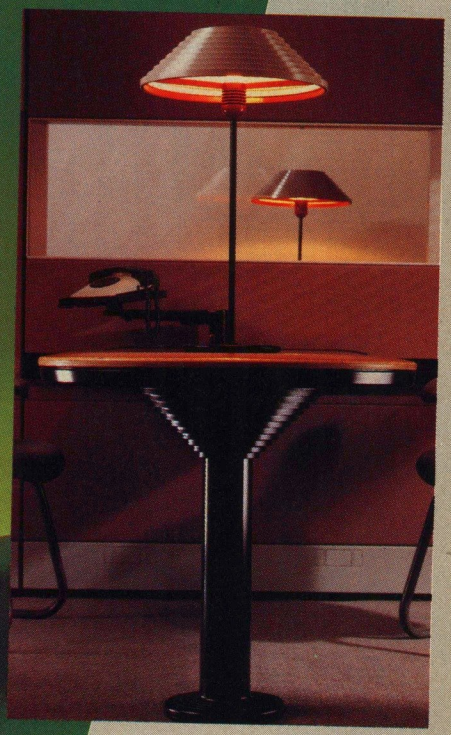
Your Apple should be positioned so that the incidence of light from overhead fixtures is as close to 45° on the monitor as possible.



Source: William Pulgram and Richard Stonis, *Designing the Automated Office* (Whitney Library of Design, New York, 1984)







Task lighting is available in various forms, from the ubiquitous Luxo (Port Chester, NY) drafting lamp *(LARGE PHOTO)* to the step-shaded desk fixture from Herman Miller *(BOTTOM RIGHT)*. Luxo's new lighting line includes Stringa *(CENTER PHOTO)*, which incorporates spring-tension pivots inside its flexible arm. Its asymmetric fixture *(CENTER RIGHT)* is specially designed for the computer, with a multifaceted reflector to eliminate glare. The Italian-designed Desk model *(TOP LEFT)* from Atelier International (New York, NY) features an aluminum support that extends from 10 to 34 inches. Artemide's (New York, NY) Alistro lamp houses the new Norelco PL13 fluorescent bulb *(TOP RIGHT)*.

Space

THE MASSARO CORPORATION---STATEMENT OF OPERATIONS ($000)

	January		February		March		April		May		June		July		August		September		October		November		December		TOTALS 1985		January		February		March		April		May	
	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%	$	%
WESTERN OPERATIONS																																				
Net Revenues:																																				
Retail Prod Under 1K	$2,993	81.1	$3,142	81.1	$3,[illegible]	[illegible]	[illegible]	81.1	$3,637	81.1	$3,819	81.1	$4,010	81.1	$4,211	81.1	$4,421	81.1	$4,642	81.1	$4,874	81.1	$5,118	81.1	47,638	81.1	$5,374	81.1	$5,643	81.1	$5,925	81.1	$6,221	81.1	$[illegible]	
Retail Prod Under 5K	898	2.4	994	2.4	[illegible]	[illegible]	[illegible]	2.4	$109	2.4	$115	2.4	$120	2.4	$126	2.8	$133	2.4	$139	2.4	$146	2.4	$154	3.4	1,489	2.4	$161	2.4	$169	2.4	$178	2.4	$187	4.2		
Retail Prod over 5K	845	1.2	947	[illegible]	[illegible]	[illegible]	[illegible]	1.2	957	1.2	950	1.2	954	1.1	957	1.3	960	1.1	963	1.1	966	1.1	969	1.9	9714	1.2	981	1.2	985	1.2	989	1.2	993	2.1		
Retail Prod Under 1K	940	1.1	942	[illegible]	[illegible]	[illegible]	[illegible]	1.1	949	1.1	952	1.1	954	1.1	957	1.1	960	1.1	963	1.1	966	1.1	969	1.2	9643	1.1	973	1.1	976	1.1	980	1.1	984	1.9		
Direct Prod Under 5K	972	1.9	975	[illegible]	[illegible]	[illegible]	[illegible]	1.9	987	1.9	992	1.9	996	1.9	1,001	2.2	1,006	1.9	1,011	1.9	1,017	1.9	1,023	2.7	11,142	1.9	1,029	1.9	1,035	1.9	1,042	1.9	1,049	3.3		
Direct Prod over 5K	954	1.5	957	[illegible]	[illegible]	[illegible]	[illegible]	1.5	965	1.5	969	1.5	972	1.5	976	1.7	980	1.5	984	1.5	988	1.5	992	2.0	9857	1.5	997	1.5	1,002	1.5	1,007	1.5	1,012	2.5		
Direct Prod Under 5K	967	1.8	971	1.8	974	1.8	978	1.7	982	1.8	986	1.8	990	1.8	995	2.1	999	1.8	1,004	1.8	1,010	1.8	1,015	2.6	11,072	1.8	1,021	1.8	1,027	1.8	1,033	1.8	1,040	3.1		
Direct Prod over 5K	931	0.9	933	0.9	935	0.9	938	0.8	938	0.9	940	0.9	942	0.9	944	1.0	946	0.9	948	0.9	950	0.9	952	1.0	9380	0.9	956	0.9	959	0.9	962	0.9	965	1.5		
OEM Prod Under 1K	974	2.8	977	2.8	981	2.8	985	1.9	989	2.8	994	2.8	999	2.8	1,004	3.2	1,009	2.9	1,014	2.9	1,020	2.9	1,026	4.4	11,056	3.2	1,032	3.2	1,038	3.2	1,044	3.2	1,050	5.4		
OEM Prod Under 5K	931	3.2	933	3.2	935	3.2	938	3.2	940	3.2	942	3.2	944	3.2	946	3.2	948	3.2	950	3.2	952	3.2	954	4.4	11,058	3.2	1,060	3.2	1,062	3.2	1,064	3.2	1,066	5.4		
OEM Prod over 5K	874	1.9	877	1.9	879	1.9	881	1.9	883	1.9	885	1.9	887	1.9	889	2.0	891	1.9	893	1.9	895	1.9	897	2.7	11,572	1.9	1,901	1.9	1,903	1.9	1,905	1.9	1,907	3.3		
OEM Prod Under 1K	9117	3.2	9123	3.2	9129	3.2	9135	3.2	9142	3.2	9149	3.2	9156	3.2	9164	3.7	9172	3.2	9181	3.2	9190	3.2	9200	4.4	11,143	3.2	9210	3.2	9221	3.2	9231	3.2	9243	5.4		
VAR Prod Under 5K	836	1.0	838	1.0	840	1.0	842	1.0	844	1.0	846	1.0	848	1.0	851	1.2	853	1.0	855	1.0	858	1.0	861	1.4	9572	1.0	864	1.0	866	1.0	869	1.0	871	1.9		
VAR Prod over 5K	872	1.9	875	1.9	879	1.9	883	1.8	887	1.9	892	1.9	896	1.9	901	2.2	906	1.9	911	1.9	917	1.9	923	2.7	11,143	1.9	9129	1.9	9135	1.9	9142	1.9	9149	3.3		
Total Net Revenues	3,698	100.0	3,875	100.0	4,068	100.0	4,272	95.0	4,485	100.0	4,710	100.0	4,945	100.0	5,192	115.5	5,452	100.0	5,724	100.0	6,011	100.0	6,311	140.4	$58,735	6,627	100.0	6,958	100.0	7,306	100.0	7,671	170.6			
Cost of Goods Sold:																																				
Retail Products	54	1.5	58	1.5	62	1.5	66	1.5	65	1.5	70	1.5	74	1.5	80	1.5	80	1.5	85	1.5	91	1.5	97	1.5	$683	97	1.5	104	1.5	111	1.5	119	1.5			
Direct Sale Products	22	0.6	23	0.6	25	0.6	26	0.6	26	0.6	28	0.6	30	0.6	32	0.6	32	0.6	32	0.6	36	0.6	39	0.6	$353	39	0.6	41	0.6	44	0.6	47	0.6			
OEM Products	24	0.7	13	0.3	14	0.3	13	0.4	13	0.3	14	0.3	15	0.3	16	0.4	16	0.3	16	0.3	18	0.3	19	0.3	$283	22	0.3	24	0.3	25	0.3	27	0.4			
VAR Products	86	0.2	86	0.2	88	0.2	88	0.7	89	0.7	92	0.7	94	0.7	96	0.7	98	0.7	98	0.7	98	0.7	98	0.7	$397	44	0.7	47	0.7	50	0.7	53	0.7			
Total COGS	186	5.0	180	4.6	189	4.6	193	3	137	3	136	3	146	3	156	3	167	3	166	3	177	3	190	3	$1,637	201	3	215	3	230	3	246	3			
Gross Profit	3,512	95.0	3,695	95.4	3,879	95.4	4,079	96.0	4,134	91.6	4349.89	97.0	4,564	96.9	4,789	96.8	5,025	112.3	5286.35	97.0	5,547	96.9	5,821	96.8	$56,898	6425.59	97.0	6,743	96.9	7,076	96.8	7,425	167.4	781		
Operating Expenses:																																				
Marketing	449	12.2	484	10.4	384	9.4	391	9.2	546	12.2	491	10.4	466	9.4	476	9.2	663	12.2	597	10.4	567	9.4	578	9.2	$6,813	806	12.2	726	10.4	689	9.4	703	9.2			
Development	382	10.3	343	8.9	326	8.0	333	7.8	464	10.3	417	8.9	397	8.0	404	7.8	564	10.3	507	8.9	482	8.0	492	7.8	$5,111	685	10.3	617	8.9	586	8.0	598	7.8			
Finance & Admin	484	10.9	364	9.4	345	8.5	352	8.2	491	10.9	442	9.4	420	8.5	428	8.2	597	10.9	537	9.4	510	8.5	521	8.2	$5,411	786	10.9	653	9.4	620	8.5	633	8.2			
Total Expenses	1,224	33.5	1,111	28.7	1,055	25.9	1,077	25.2	1,500	33.5	1,350	28.7	1,283	25.9	1,308	25.2	1,824	33.5	1,641	28.7	1,559	25.9	1,591	25.2	$16,535	2,217	33.5	1,993	28.7	1,895	25.9	1,933	25.2	2		
Income Opns	2,344	63.5	2,644	68.2	2,885	70.9	3,058	71.6	2,849	63.5	3,213	68.2	3,586	70.9	3,717	71.6	3,463	63.5	3,986	68.2	4,262	70.9	4,518	71.6	$40,363	4,299	63.5	4,748	68.2	5,180	70.9	5,492	71.6	5		
Interest Inc. (Exp)	11	0.3	(9)	-0.2	(9)	-0.2	0	0.0	11	0.2	(9)	-0.2	(9)	-0.2	0	0.0	11	0.2	(9)	-0.2	(9)	-0.1	0	0.0	(821)	11	0.2	(9)	-0.1	(9)	-0.1	0	0.0			
Income before Taxes	2,355	63.8	2,635	68.0	2,876	70.7	3,058	71.6	2,860	63.8	3,204	68.0	3,497	70.7	3,717	71.6	3,474	63.7	3,897	68.1	4,253	70.8	4,518	71.6	$40,342	4,220	63.7	4,739	68.1	5,171	70.8	5,492	71.6	5		
Prov. Inc. Taxes	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	$0.0	0	0.0	0	0.0	0	0.0	0	0.0			
Net Income (Loss)	$2,355	63.8	$2,635	68.0	$2,876	70.7	$3,058	71.6	$2,860	63.8	$3,204	68.0	$3,497	70.7	$3,717	71.6	$3,474	63.7	$3,897	68.1	$4,253	70.8	$4,518	71.6	$40,342	$4,220	63.7	$4,739	68.1	$5,171	70.8	$5,492	71.6	$5		
EASTERN OPERATIONS																																				
Net Revenues:																																				
Retail Prod Under 1K	$2,520	81.1	$2,646	81.1	$2,778	81.1	$2,917	81.1	$3,063	81.1	$3,216	81.1	$3,377	81.1	$3,546	81.1	$3,723	81.1	$3,909	81.1	$4,105	81.1	$4,310	81.1	$8,111	$4,526	81.1	$4,752	81.1	$4,989	81.1	$5,239	81.1	$5		
Retail Prod Under 5K	$76	2.4	$79	2.4	$83	2.4	$88	1.9	$92	2.4	$96	2.4	$101	2.4	$106	2.4	$112	2.4	$117	2.4	$123	2.4	$129	2.9	$1,083	$136	2.4	$143	2.4	$150	2.4	$157	3.5			
Retail Prod over 5K	$38	1.2	$40	1.2	$42	1.2	$44	1.0	$46	1.2	$48	1.2	$50	1.1	$53	1.1	$56	1.1	$59	1.1	$62	1.1	$65	1.4	$602	$68	1.2	$71	1.2	$75	1.2	$79	1.7			
Retail Prod Under 1K	$34	1.1	$36	1.1	$38	1.1	$39	0.9	$41	1.1	$43	1.1	$45	1.1	$48	1.1	$50	1.1	$53	1.1	$55	1.1	$58	1.3	$542	$61	1.1	$64	1.1	$67	1.1	$71	1.6			
Direct Prod Under 5K	$68	1.9	$64	1.9	$67	1.9	$70	1.6	$74	1.9	$77	1.9	$81	1.9	$85	1.9	$89	1.9	$94	1.9	$99	1.9	$105	2.3	$963	$109	1.9	$114	1.9	$120	1.9	$126	2.8			
Direct Prod over 5K	$45	1.5	$48	1.5	$50	1.5	$53	1.2	$55	1.5	$58	1.5	$61	1.5	$64	1.4	$67	1.5	$70	1.5	$74	1.5	$78	1.7	$722	$81	1.5	$86	1.5	$90	1.5	$94	2.1			
OEM Prod Under 1K	$57	1.8	$60	1.8	$63	1.8	$66	1.5	$69	1.8	$72	1.8	$76	1.8	$80	1.8	$84	1.8	$88	1.8	$92	1.8	$97	2.2	$903	$102	1.8	$107	1.8	$112	1.8	$118	2.6			
OEM Prod Under 5K	$26	0.9	$28	0.9	$29	0.9	$31	0.7	$32	0.9	$34	0.9	$35	0.9	$37	0.8	$39	0.9	$41	0.9	$42	0.9	$45	1.0	$401	$48	0.9	$50	0.9	$52	0.9	$55	1.2			
OEM Prod over 5K	$62	2.0	$65	2.0	$68	2.0	$72	1.6	$75	2.0	$79	2.0	$83	2.0	$87	2.0	$91	2.0	$96	2.0	$100	2.0	$106	2.4	$987	$111	2.0	$117	2.0	$123	2.0	$129	2.9			
VAR Prod Under 1K	$98	3.2	$103	3.2	$108	3.2	$114	2.5	$119	3.2	$125	3.2	$130	3.2	$138	3.1	$145	3.2	$152	3.2	$160	3.2	$168	3.7	$1,564	$176	3.2	$185	3.2	$195	3.2	$204	4.5			
VAR Prod Under 5K	$30	1.0	$32	1.0	$33	1.0	$35	0.8	$37	1.0	$39	1.0	$41	1.0	$43	0.9	$45	1.0	$47	1.0	$49	1.0	$52	1.2	$481	$54	1.0	$57	1.0	$60	1.0	$63	1.4			
VAR Prod over 5K	$60	1.9	$64	1.9	$67	1.9	$70	1.6	$74	1.9	$77	1.9	$81	1.9	$85	1.9	$89	1.9	$94	1.9	$99	1.9	$103	2.3	$963	$109	1.9	$114	1.9	$120	1.9	$126	2.8			
Total Net Revenues	3,187	100.0	3,263	100.0	3,426	100.0	3,597	80.0	3,777	100.0	3,966	100.0	4,164	100.0	4,372	97.2	4,591	100.0	4,821	100.0	5,062	100.0	5,315	118.2	$49,461	5,586	100.0	5,859	100.0	6,152	100.0	6,458	143.7	6		
Cost of Goods Sold:																																				
Retail Products	45	1.5	49	1.5	52	1.5	56	1.5	55	1.5	59	1.5	63	1.5	68	1.5	67	1.5	72	1.5	77	1.5	82	1.5	$744	81	1.5	87	1.5	93	1.5	100	1.5			
Direct Sale Products	18	0.6	19	0.6	21	0.6	22	0.6	22	0.6	24	0.6	25	0.6	27	0.6	27	0.6	29	0.6	31	0.6	33	0.6	$297	33	0.6	35	0.6	37	0.6	40	0.6			
OEM Products	10	0.3	11	0.3	12	0.3	13	0.4	13	0.2	14	0.3	15	0.3	16	0.4	15	0.3	16	0.3	18	0.3	19	0.4	$171	19	0.3	20	0.3	21	0.3	23	0.4			
VAR Products	20	0.7	22	0.7	23	0.7	25	0.7	25	0.7	27	0.7	28	0.7	30	0.7	30	0.7	32	0.7	35	0.7	37	0.7	$335	37	0.7	39	0.7	42	0.7	45	0.7			
Total COGS	94	3	101	3	108	3	116	3	115	3	123	3	131	3	140	3	139	3	149	3	160	3	171	3	$1,547	169	3	181	3	194	3	208	3			
Gross Profit	3013.06	97.0	3,162	96.9	3,318	96.8	3,482	76.8	3662.39	97.0	3,843	96.9	4,033	96.8	4,232	94.0	4451.86	97.0	4,671	96.9	4,902	96.8	5,144	115.9	$47,914	5411.02	97.0	5,678	96.9	5,958	96.8	6,253	140.5	657		
Operating Expenses:																																				
Marketing	378	12.2	349	10.4	323	9.4	339	9.2	459	12.2	414	10.4	393	9.4	401	9.2	558	12.2	503	10.4	477	9.4	487	9.2	$5,063	679	12.2	611	10.4	580	9.4	592	9.2			
Development	321	10.3	289	8.9	275	8.0	280	7.8	391	10.3	351	8.9	334	8.0	341	7.8	470	10.3	427	8.9	406	8.0	414	7.8	$4,304	577	10.3	519	8.9	493	8.0	503	7.8			
Finance & Admin	340	10.9	306	9.4	291	8.5	297	8.2	414	10.9	372	9.4	354	8.5	361	8.2	503	10.9	452	9.4	430	8.5	438	8.2	$4,557	611	10.9	550	9.4	522	8.5	533	8.2			
Total Expenses	1,039	33.2	944	28.7	889	25.9	907	25.2	1,264	33.5	1,137	28.7	1,081	25.9	1,102	25.2	1,531	33.5	1,382	28.7	1,313	25.9	1,339	25.2	$13,924	1,867	33.5	1,680	28.7	1,596	25.9	1,628	25.2	2		
Income Opns	1,974	63.1	2,218	68.2	2,429	70.9	2,575	71.6	2,399	63.5	2,706	68.2	2,953	70.9	3,130	71.6	2,916	63.5	3,289	68.2	3,589	70.9	3,805	71.6	$33,998	3,544	63.5	3,998	68.2	4,362	70.9	4,624	71.6	4		
Interest Inc. (Exp)	11	0.3	(9)	-0.3	(9)	-0.2	0	0.0	11	0.3	(9)	-0.2	(9)	-0.2	0	0.0	11	0.2	(9)	-0.2	(9)	-0.1	0	0.0	(821)	11	0.2	(9)	-0.2	(9)	-0.1	0	0.0			
Income before Taxes	1,985	63.9	2,217	68.0	2,420	70.6	2,575	71.6	2,410	63.8	2,697	68.0	2,944	70.7	3,130	71.6	2,927	63.8	3,280	68.0	3,580	70.7	3,805	71.6	$33,969	3,555	63.7	3,989	68.1	4,353	70.8	4,624	71.6	4		
Prov. Inc. Taxes	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	$0.0	0	0.0	0	0.0	0	0.0	0	0.0			
Net Income (Loss)	$1,985	63.9	$2,217	68.0	$2,420	70.6	$2,575	71.6	$2,410	63.8	$2,697	68.0	$2,944	70.7	$3,130	71.6	$2,927	63.8	$3,280	68.0	$3,580	70.7	$3,805	71.6	$33,969	$3,555	63.7	$3,989	68.1	$4,353	70.8	$4,624	71.6	4		
NORTHERN OPERATIONS																																				
Net Revenues:																																				
Retail Prod Under 1K	$3,150	81.1	$3,308	81.1	$3,473	81.1	$3,647	81.1	$3,829	81.1	$4,020	81.1	$4,221	81.1	$4,432	81.1	$4,654	81.1	$4,887	81.1	$5,131	81.1	$5,388	81.1	$8,139	$5,657	81.1	$5,940	81.1	$6,237	81.1	$6,549	81.1	9		
Retail Prod Under 5K	$95	2.4	$99	2.4	$104	2.4	$109	2.4	$115	2.4	$120	2.4	$127	2.4	$133	3.9	$140	2.4	$147	2.4	$154	2.4	$162	3.6	$1,584	$170	2.4	$178	2.4	$187	2.4	$196	4.4			
Retail Prod over 5K	$47	1.2	$50	1.2	$52	1.2	$55	1.2	$57	1.2	$60	1.2	$63	1.1	$66	1.3	$69	1.1	$72	1.1	$77	1.1	$81	1.8	$752	$85	1.2	$89	1.2	$94	1.2	$98	2.2			
Retail Prod Under 1K	$43	1.1	$45	1.1	$47	1.1	$49	1.1	$52	1.1	$54	1.1	$57	1.1	$60	1.3	$63	1.1	$66	1.1	$69	1.1	$73	1.6	$903	$76	1.1	$80	1.1	$84	1.1	$88	2.0			
Direct Prod Under 5K	$76	1.9	$79	1.9	$83	1.9	$88	1.9	$92	1.9	$96	1.9	$101	1.9	$106	2.4	$112	1.9	$117	1.9	$123	1.9	$129	2.9	$1,128	$136	1.9	$143	1.9	$150	1.9	$157	3.5			
Direct Prod over 5K	$57	1.5	$60	1.5	$63	1.5	$66	1.5	$68	1.8	$72	1.5	$75	1.5	$80	1.8	$84	1.5	$88	1.5	$92	1.5	$97	2.2	$903	$102	1.5	$107	1.5	$112	1.5	$118	2.6			
Direct Prod Under 1K	$71	1.8	$74	1.8	$78	1.8	$82	1.8	$86	1.8	$90	1.8	$95	1.8	$100	2.2	$105	1.8	$110	1.8	$115	1.8	$121	2.7	$1,128	$134	1.8	$140	1.8	$147	1.8	$154	3.4			
OEM Prod Under 5K	$33	0.9	$35	0.9	$36	0.9	$38	0.9	$40	0.9	$42	0.9	$44	0.9	$47	1.0	$49	0.9	$51	0.9	$54	0.9	$57	1.3	$526	$59	0.9	$62	0.9	$65	0.9	$69	1.5			
OEM Prod over 5K	$77	2.0	$81	2.0	$85	2.0	$90	2.0	$94	2.0	$99	2.0	$104	2.0	$109	2.4	$114	2.0	$120	2.0	$126	2.0	$133	2.9	$1,233	$139	2.0	$146	2.0	$153	2.0	$161	3.6			
OEM Prod Under 1K	$123	3.2	$129	3.2	$135	3.2	$142	3.2	$149	3.2	$157	3.2	$165	3.2	$173	3.8	$182	3.2	$191	3.2	$200	3.2	$210	4.7	$1,893	$221	3.2	$232	3.2	$243	3.2	$255	5.7			
VAR Prod Under 5K	$38	1.0	$40	1.0	$42	1.0	$43	1.0	$44	1.0	$46	1.0	$48	1.0	$51	1.0	$53	1.2	$55	1.0	$57	1.0	$60	1.3	$602	$68	1.0	$71	1.0	$75	1.0	$79	1.8			
VAR Prod over 5K	$75	1.9	$79	1.9	$83	1.9	$88	1.9	$92	1.9	$96	1.9	$101	1.9	$106	2.4	$112	1.9	$117	1.9	$123	1.9	$129	2.9	$1,203	$136	1.9	$143	1.9	$150	1.9	$157	3.5			
Total Net Revenues	3,884	100.0	4,078	100.0	4,282	100.0	4,497	100.0	4,721	100.0	4,957	100.0	5,205	100.0	5,466	121.6	5,739	100.0	6,026	100.0	6,327	100.0	6,643	147.7	$61,826	6,976	100.0	7,324	100.0	7,691	100.0	8,075	179.6			
Cost of Goods Sold:																																				
Retail Products	57	1.5	61	1.5	65	1.5	69	1.5	74	1.5	79	1.5	84	1.5	90	1.5	96	1.5	102	1.5	109	1.5	117	1.5	$930	102	1.5	109	1.5	117	1.5	125	1.5			
Direct Sale Products	23	0.6	24	0.6	26	0.6	28	0.6	28	0.6	29	0.6	32	0.6	34	0.6	34	0.6	36	0.6	38	0.6	41	0.6	$372	41	0.6	44	0.6	47	0.6	50	0.6			
OEM Products	13	0.3	14	0.3	15	0.3	16	0.4	16	0.3	17	0.3	18	0.3	19	0.4	19	0.3	21	0.3	22	0.3	24	0.4	$214	23	0.3	25	0.3	27	0.3	29	0.4			
VAR Products	26	0.7	27	0.7	29	0.7	31	0.7	31	0.7	33	0.7	36	0.7	38	0.7	38	0.7	40	0.7	43	0.7	46	0.7	$418	46	0.7	49	0.7	52	0.7	56	0.7			
Total COGS	118	3	126	3	135	3	144	3	143	3	153	3	164	3	176	3	174	3	186	3	199	3	213	3	$1,934	212	3	227	3	242	3	259	3			
Gross Profit	3766.32	97.0	3,952	96.9	4,147	96.8	4,352	96.8	4577.99	97.0	4,804	96.9	5,041	96.8	5,290	118.3	5564.58	97.0	5,839	96.9	6,128	96.8	6,430	144.5	$59,893	6763.78	97.0	7,096	96.9	7,448	96.8	7,816	175.4	82		
Operating Expenses:																																				
Marketing	473	12.2	425	10.4	404	9.4	412	9.2	574	12.2	517	10.4	491	9.4	501	9.2	698	12.2	628	10.4	597	9.4	609	9.2	$6,329	849	12.2	764	10.4	726	9.4	740	9.2			
Development	402	10.3	361	8.9	343	8.0	350	7.8	488	10.3	439	8.9	417	8.0	425	7.8	593	10.3	534	8.9	507	8.0	517	7.8	$5,300	721	10.3	649	8.9	617	8.0	629	7.8			
Finance & Admin	425	10.9	383	9.4	364	8.5	371	8.2	517	10.9	465	9.4	442	8.5	451	8.2	628	10.9	565	9.4	537	8.5	548	8.2	$5,696	764	10.9	687	9.4	653	8.5	666	8.2			
Total Expenses	1,299	33.5	1,169	28.7	1,111	25.9	1,133	25.2	1,

Case,

June		July		August		September		October		November		December		TOTALS 1986
x	$	x	$	x	$	x	$	x	$	x	$	x	$	$
81.1	$6,859	81.1	$7,202	81.1	$7,562	81.1	$7,940	81.1	$8,337	81.1	$8,754	81.1	$9,192	81.1	$5,540
2.4	$206	2.4	$216	2.4	$227	5.0	$238	2.4	$250	2.4	$263	2.4	$276	6.1	$2,566
1.2	$103	1.2	$108	1.2	$113	2.5	$119	1.2	$125	1.2	$131	1.2	$138	3.1	$1,283
1.1	$93	1.1	$97	1.1	$102	2.3	$107	1.1	$113	1.1	$118	1.1	$124	2.8	$1,155
1.9	$165	1.9	$173	1.9	$181	4.0	$191	1.9	$200	1.9	$210	1.9	$221	4.9	$2,053
1.5	$123	1.5	$130	1.5	$136	3.0	$143	1.5	$150	1.5	$158	1.5	$165	3.7	$1,540
1.6	$154	1.6	$162	1.6	$170	3.8	$179	1.6	$188	1.6	$197	1.6	$207	4.6	$1,925
0.9	$72	0.9	$76	0.9	$79	1.8	$83	0.9	$88	0.9	$92	0.9	$97	2.1	$898
2.0	$169	2.0	$177	2.0	$186	4.1	$195	2.0	$205	2.0	$215	2.0	$226	5.0	$2,104
3.2	$267	3.2	$281	3.2	$295	6.6	$310	3.2	$325	3.2	$341	3.2	$358	6.8	$3,336
1.6	$88	1.6	$86	1.6	$91	2.0	$95	1.6	$100	1.6	$105	1.6	$110	2.5	$1,026
1.9	$165	1.9	$173	1.9	$181	4.0	$191	1.9	$200	1.9	$210	1.9	$221	4.9	$2,053
100.0	$8,458	100.0	$8,881	100.0	$9,325	207.4	$9,791	100.0	$10,280	100.0	$10,794	100.0	$11,334	252.1	$105,480
1.5	126	1.5	135	1.5	144	1.5	143	1.5	153	1.5	164	1.5	175	1.5	$1,586
0.6	50	0.6	54	0.6	58	0.6	57	0.6	61	0.6	65	0.6	70	0.6	$634
0.3	29	0.3	31	0.3	33	0.4	33	0.3	35	0.3	38	0.3	40	0.4	$365
0.7	57	0.7	61	0.7	65	0.7	64	0.7	69	0.7	74	0.7	79	0.7	$714
3	262	3	280	3	300	3	297	3	318	3	340	3	364	3	$3,299
97.0	8,196	96.9	8,601	96.8	9,025	204.2	9493.53	97.0	9,962	96.9	10,454	96.8	10,970	248.9	$102,181
12.2	882	10.4	838	9.4	855	9.2	1,191	12.2	1,072	10.4	1,018	9.4	1,039	9.2	$10,798
10.3	758	8.9	712	8.0	726	7.8	1,012	10.3	911	8.9	866	8.0	883	7.8	$9,178
10.9	794	9.4	754	8.5	769	8.2	1,072	10.9	965	9.4	916	8.5	935	8.2	$9,718
33.5	2,425	28.7	2,384	25.9	2,350	25.2	3,275	33.5	2,948	28.7	2,800	25.9	2,856	25.2	$29,694
63.5	5,771	68.2	6,297	70.9	6,675	71.6	6,218	63.5	7,015	68.2	7,654	70.9	8,114	71.6	72,487
0.1	(9)	-0.1	(9)	-0.1	0	0.0	11	0.1	(9)	-0.1	(9)	-0.1	0	0.0	(026)
63.6	5,762	68.1	6,288	70.8	6,675	71.6	6,229	63.6	7,006	68.1	7,645	70.8	8,114	71.6	72,461
0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0
63.6	5,762	68.1	6,288	70.8	6,675	71.6	6,229	63.6	7,006	68.1	7,645	70.8	8,114	71.6	72,461
81.1	$5,776	81.1	$6,065	81.1	$6,368	81.1	$6,686	81.1	$7,021	81.1	$7,372	81.1	$7,740	81.1	72,034
2.4	$173	2.4	$182	2.4	$191	4.2	$201	2.4	$211	2.4	$221	2.4	$232	5.2	$2,161
1.2	$87	1.2	$91	1.2	$96	2.1	$100	1.2	$105	1.2	$111	1.2	$116	2.6	$1,081
1.1	$78	1.1	$82	1.1	$86	1.9	$90	1.1	$95	1.1	$100	1.1	$104	2.3	$972
1.9	$139	1.9	$146	1.9	$153	3.4	$160	1.9	$168	1.9	$177	1.9	$186	4.1	$1,789
1.5	$104	1.5	$109	1.5	$115	2.5	$120	1.5	$126	1.5	$133	1.5	$139	3.1	$1,297
1.6	$130	1.6	$136	1.6	$143	3.2	$150	1.6	$158	1.6	$166	1.6	$174	3.9	$1,621
0.9	$61	0.9	$64	0.9	$67	1.5	$70	0.9	$74	0.9	$77	0.9	$81	1.8	$756
2.0	$142	2.0	$149	2.0	$157	3.5	$164	2.0	$173	2.0	$181	2.0	$190	4.2	$1,772
3.2	$225	3.2	$237	3.2	$248	5.5	$261	3.2	$274	3.2	$287	3.2	$302	6.7	$2,809
1.6	$69	1.6	$72	1.6	$76	1.7	$80	1.6	$84	1.6	$88	1.6	$93	2.1	$864
1.9	$139	1.9	$146	1.9	$153	3.4	$160	1.9	$168	1.9	$177	1.9	$186	4.1	$1,789
00.0	7,122	100.0	7,478	100.0	7,852	174.6	8,245	100.0	8,657	100.0	9,090	100.0	9,544	212.3	$88,825
1.5	106	1.5	113	1.5	121	1.5	129	1.5	129	1.5	138	1.5	147	1.5	$1,336
0.6	42	0.6	45	0.6	49	0.6	48	0.6	52	0.6	55	0.6	59	0.6	$534
0.3	24	0.3	26	0.3	28	0.4	28	0.3	30	0.3	32	0.3	34	0.4	$307
0.7	48	0.7	51	0.7	55	0.7	54	0.7	58	0.7	62	0.7	66	0.7	$601
3	220	3	236	3	252	3	250	3	266	3	287	3	307	3	$2,778
97.0	6,902	96.9	7,243	96.8	7,600	171.4	7994.55	97.0	8,389	96.9	8,803	96.8	9,238	209.1	$86,047
12.2	743	10.4	785	9.4	720	9.2	1,003	12.2	903	10.4	858	9.4	875	9.2	$9,093
10.3	631	8.9	600	8.0	612	7.8	853	10.3	767	8.9	729	8.0	743	7.8	$7,729
10.9	668	9.4	635	8.5	648	8.2	903	10.9	812	9.4	772	8.5	787	8.2	$8,184
33.5	2,042	28.7	1,940	25.9	1,979	25.2	2,758	33.5	2,482	28.7	2,358	25.9	2,485	25.2	$25,005
63.5	4,860	68.2	5,302	70.9	5,621	71.6	5,236	63.5	5,907	68.2	6,445	70.9	6,832	71.6	61,042
0.2	(9)	-0.1	(9)	-0.1	0	0.0	11	0.1	(9)	-0.1	(9)	-0.1	0	0.0	(026)
63.7	4,851	68.1	5,293	70.8	5,621	71.6	5,247	63.6	5,898	68.1	6,436	70.8	6,832	71.6	61,015
0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0
63.7	4,851	68.1	5,293	70.8	5,621	71.6	5,247	63.6	5,898	68.1	6,436	70.8	6,832	71.6	61,015
81.1	$7,220	81.1	$7,581	81.1	$7,960	81.1	$8,358	81.1	$8,776	81.1	$9,215	81.1	$9,675	81.1	90,042
2.4	$217	2.4	$227	2.4	$239	5.3	$251	2.4	$263	2.4	$276	2.4	$290	6.5	$2,701
1.2	$108	1.2	$114	1.2	$119	2.7	$125	1.2	$132	1.2	$138	1.2	$145	3.2	$1,351
1.1	$97	1.1	$102	1.1	$107	2.4	$113	1.1	$118	1.1	$124	1.1	$131	2.9	$1,216
1.9	$173	1.9	$182	1.9	$191	4.2	$201	1.9	$211	1.9	$221	1.9	$232	5.2	$2,161
1.5	$130	1.5	$136	1.5	$143	3.2	$150	1.5	$158	1.5	$166	1.5	$174	3.9	$1,621
1.6	$162	1.6	$171	1.6	$179	4.0	$188	1.6	$197	1.6	$207	1.6	$218	4.8	$2,026
0.9	$76	0.9	$80	0.9	$84	1.9	$88	0.9	$92	0.9	$97	0.9	$102	2.3	$945
2.0	$178	2.0	$186	2.0	$196	4.4	$206	2.0	$216	2.0	$227	2.0	$238	5.3	$2,215
3.2	$282	3.2	$296	3.2	$310	6.9	$325	3.2	$342	3.2	$359	3.2	$377	8.4	$3,512
1.6	$87	1.6	$91	1.6	$96	2.1	$100	1.6	$105	1.6	$111	1.6	$116	2.6	$1,081
1.9	$173	1.9	$182	1.9	$191	4.2	$201	1.9	$211	1.9	$221	1.9	$232	5.2	$2,161
00.0	8,903	100.0	9,348	100.0	9,815	218.3	10,306	100.0	10,821	100.0	11,362	100.0	11,931	265.3	$111,031
1.5	132	1.5	142	1.5	152	1.5	150	1.5	161	1.5	172	1.5	184	1.5	$1,670
0.6	53	0.6	57	0.6	61	0.6	60	0.6	64	0.6	69	0.6	74	0.6	$668
0.3	30	0.3	33	0.3	35	0.4	35	0.3	37	0.3	40	0.3	42	0.4	$384
0.7	60	0.7	64	0.7	68	0.7	68	0.7	72	0.7	76	0.7	83	0.7	$751
3	275	3	295	3	315	3	313	3	335	3	358	3	383	3	$3,473
97.0	8,627	96.9	9,053	96.8	9,500	215.1	9993.19	97.0	10,487	96.9	11,004	96.8	11,547	262.1	$107,558
12.2	928	10.4	882	9.4	899	9.2	1,254	12.2	1,128	10.4	1,072	9.4	1,093	9.2	$11,366
10.3	789	8.9	750	8.0	765	7.8	1,066	10.3	959	8.9	911	8.0	929	7.8	$9,661
10.9	835	9.4	794	8.5	810	8.2	1,128	10.9	1,015	9.4	965	8.5	984	8.2	$10,229
33.5	2,553	28.7	2,425	25.9	2,474	25.2	3,448	33.5	3,103	28.7	2,948	25.9	3,007	25.2	$31,257
63.5	6,075	68.2	6,628	70.9	7,026	71.6	6,546	63.5	7,384	68.2	8,057	70.9	8,541	71.6	76,382
0.1	(9)	-0.1	(9)	-0.1	0	0.0	11	0.1	(9)	-0.1	(9)	-0.1	0	0.0	(026)
63.6	6,066	68.1	6,619	70.8	7,026	71.6	6,557	63.6	7,375	68.1	8,048	70.8	8,541	71.6	76,276
0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0
63.6	6,066	68.1	6,619	70.8	7,026	71.6	6,557	63.6	7,375	68.1	8,048	70.8	8,541	71.6	76,276
81.1	$6,498	81.1	$6,823	81.1	$7,164	81.1	$7,522	81.1	$7,898	81.1	$8,293	81.1	$8,708	81.1	61,038
2.4	$195	2.4	$205	2.4	$215	4.8	$226	2.4	$237	2.4	$249	2.4	$261	5.8	$2,431
1.2	$97	1.2	$102	1.2	$107	2.4	$113	1.2	$118	1.2	$124	1.2	$131	2.9	$1,216
1.1	$88	1.1	$92	1.1	$97	2.2	$102	1.1	$107	1.1	$112	1.1	$118	2.6	$1,094
1.9	$156	1.9	$164	1.9	$172	3.8	$181	1.9	$190	1.9	$199	1.9	$209	4.6	$1,945
1.5	$117	1.5	$123	1.5	$129	2.9	$135	1.5	$142	1.5	$149	1.5	$157	3.5	$1,459
1.6	$146	1.6	$154	1.6	$161	3.6	$169	1.6	$178	1.6	$187	1.6	$196	4.4	$1,823
0.9	$68	0.9	$72	0.9	$75	1.7	$79	0.9	$83	0.9	$87	0.9	$91	2.0	$851
2.0	$160	2.0	$168	2.0	$176	3.9	$185	2.0	$194	2.0	$204	2.0	$214	4.8	$1,994
3.2	$253	3.2	$266	3.2	$279	6.2	$293	3.2	$308	3.2	$323	3.2	$340	7.6	$3,160
1.6	$78	1.6	$82	1.6	$86	1.9	$90	1.6	$95	1.6	$100	1.6	$104	2.3	$972
1.9	$156	1.9	$164	1.9	$172	3.8	$181	1.9	$190	1.9	$199	1.9	$209	4.6	$1,945
100.0	8,013	100.0	8,413	100.0	8,834	196.5	9,276	100.0	9,739	100.0	10,226	100.0	10,738	238.8	$99,928
1.5	119	1.5	128	1.5	136	1.5	135	1.5	145	1.5	155	1.5	166	1.5	$1,503
0.6	48	0.6	51	0.6	55	0.6	54	0.6	58	0.6	62	0.6	66	0.6	$601
0.3	27	0.3	29	0.3	31	0.4	31	0.3	33	0.3	36	0.3	38	0.4	$346
0.7	54	0.7	57	0.7	61	0.7	61	0.7	65	0.7	70	0.7	75	0.7	$676
3	248	3	265	3	284	3	282	3	301	3	322	3	345	3	$3,125
97.0	7,765	96.9	8,148	96.8	8,550	193.2	8993.87	97.0	9,438	96.9	9,904	96.8	10,393	235.6	$96,803
12.2	835	10.4	794	9.4	810	9.2	1,128	12.2	1,015	10.4	965	9.4	984	9.2	$10,229
10.3	710	8.9	675	8.0	686	7.8	959	10.3	863	8.9	820	8.0	836	7.8	$8,695
10.9	752	9.4	714	8.5	729	8.2	1,015	10.9	914	9.4	868	8.5	886	8.2	$9,206
33.5	2,297	28.7	2,183	25.9	2,226	25.2	3,103	33.5	2,793	28.7	2,653	25.9	2,706	25.2	$28,121
63.5	5,467	68.2	5,965	70.9	6,324	71.6	5,891	63.5	6,645	68.2	7,251	70.9	7,687	71.6	68,672
0.1	(9)	-0.1	(9)	-0.1	0	0.0	11	0.1	(9)	-0.1	(9)	-0.1	0	0.0	(026)
63.7	5,458	68.1	5,956	70.8	6,324	71.6	5,902	63.6	6,636	68.1	7,242	70.8	7,687	71.6	68,645
0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0
63.7	$5,458	68.1	$5,956	70.8	$6,324	71.6	$5,902	63.6	$6,636	68.1	$7,242	70.8	$7,687	71.6	$68,645

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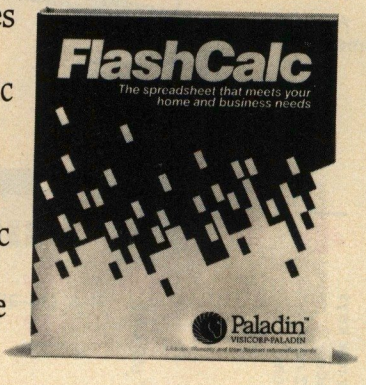

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(continued from page 26)
high degree of built-in design flexibility to accommodate a variety of postures and body sizes. The research these designs reflect shows that computer work involves a variety of sitting positions—from leaning over the desk to reclining—that change every eight to ten minutes. States Niels Diffrient, an industrial designer who has won awards for his chair designs, "Sitting is an athletic activity. Tasks such as typing put a 30% additional load on the spine."

Although experts agree that a "good" chair design must pay attention to the lumbar region of the spine just above the pelvic bone, to the buttocks, and to the popliteal (backs of the thighs), translating these anatomical concerns into physical reality has produced various results. Bill Stumpf, a Minnesota industrial designer who has produced several outstanding furniture designs for Herman Miller, Inc., explains, "Ergonomics is not a hard science in the sense that some sciences are. If it were, chairs would tend to look more alike than they do now."

What the ergonomic specialists agree on is that seating should conform to several criteria: a rounded front edge,

YOUR WORK SURFACES SHOULD BE FLEXIBLE, SPACIOUS, AND NONREFLECTIVE.

Working Surfaces

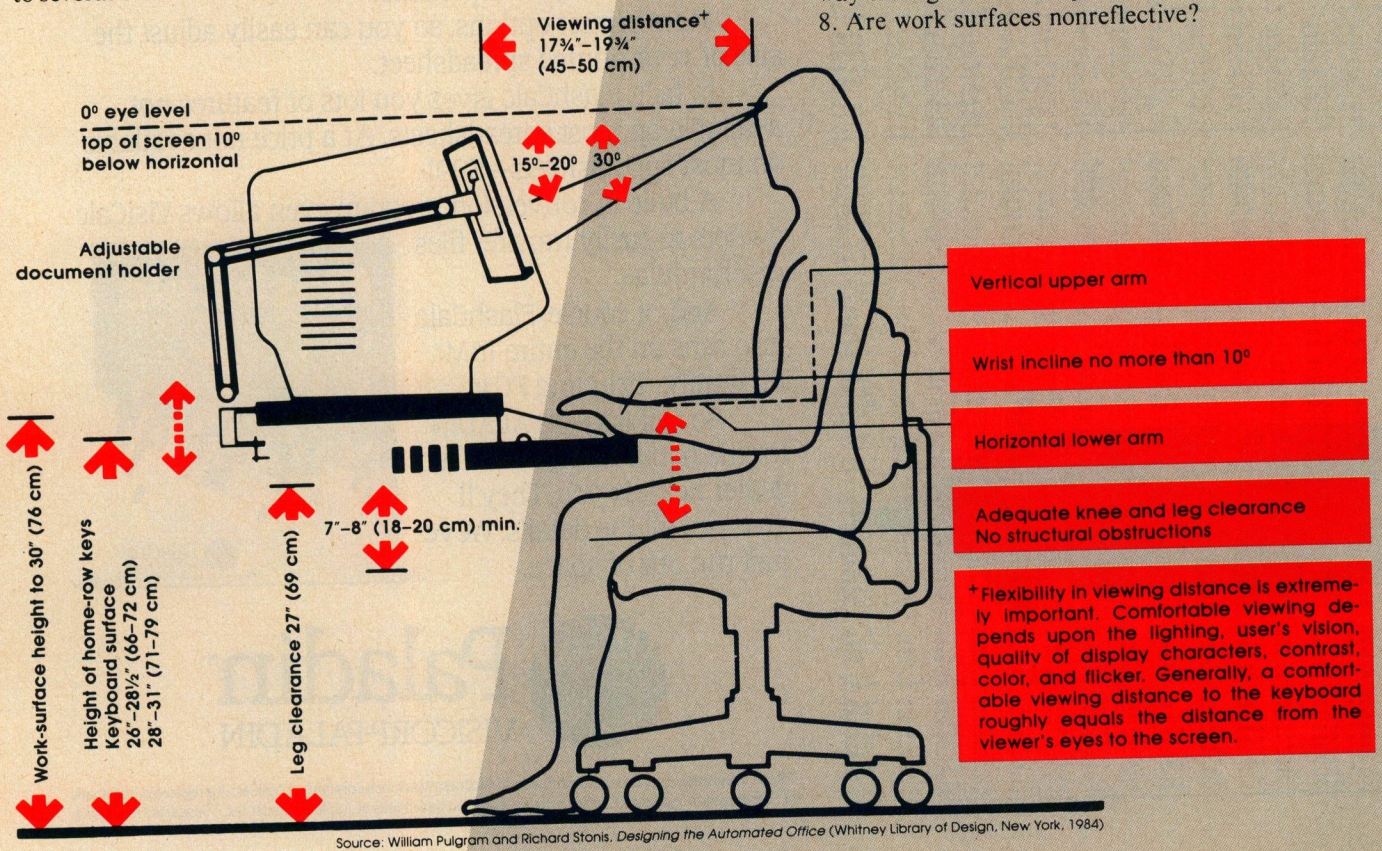
Ideally, your desk should be as flexibly designed as your chair. For a relaxed hand position, keyboards and displays should be positioned at different heights, the keyboard lower than the standard 29-inch desk height. Many of the computer-support desks and terminal stands currently available feature separately adjustable surfaces for monitors and keyboards, which you can move up, down, or sideways with a lever, crank, or other mechanism. Some monitor-support surfaces can tilt up to 15 degrees, so you can adjust viewing angles and rotate for shared use.

Checklist

Consider the following questions when you are planning your work surface:

1. Are there separate work surfaces for keyboards and displays?
2. Can you tilt the work surfaces and adjust their height?
3. Does adequate space exist for storing copies, manuals, documents, and personal belongings?
4. Is the work surface deep enough so that you can place your monitor at a preferred distance?
5. Is the legroom adequate to accommodate different postures?
6. Can you rest your arms when you are not typing?
7. Can you route the computer wiring out of the way through the desktop?
8. Are work surfaces nonreflective?

A work surface should be wide and deep enough to accommodate a computer's terminal, keyboard, task lighting, and document holder, as well as provide for height, angle, and tilt adjustments for proper monitor viewing.



Source: William Pulgram and Richard Stonis, *Designing the Automated Office* (Whitney Library of Design, New York, 1984)

Many of the most advanced ergonomic desk designs come from Europe. Hartmut Esslinger, the industrial designer responsible for styling Apple's IIc, has developed several innovative workstations for the German manufacturer König & Neurath. His King Alpha executive desk *(FAR LEFT)*, and King Zet line *(LEFT AND LARGE PHOTO BELOW)*, both available from Wright Line, (Worcester, MA), are angled through cleverly designed joint mechanisms.

Other European products include the Swedish DataBord 920 system from Krueger *(MIDDLE LEFT)* with separate surfaces for terminal and keyboard. Knoll International's Stephens terminal stand *(BOTTOM LEFT)* adopts the ergonomic chair's five-star base and height-adjustability in its design. The Brewster Company's (Brewster, NY) computer home *(BOTTOM RIGHT)* incorporates shelving and storage in a more traditional, handcrafted wood cabinet.

support for the lumbar vertebrae, a lightly padded seat, a backrest high enough to reach the lower shoulder, adjustable seat height, and tiltable seat and back. The aim of current ergonomic chair designs is to allow users to customize seating to their specific body proportions and sitting postures. As Stumpf notes, "A chair should be in proportion to the person using it. There shouldn't be this problem of looking like a little kid in a papa-bear chair. It has to fit."

Similarly, your desk's design should be flexible enough to adapt to your particular style of working. In supporting your Apple, it must accommodate two separate tasks: viewing data on a monitor at eye level and entering data via keyboard at typing level. According to Robert B. Cadwallader, vice chairman of SunarHauserman, a leading manufacturer of ergonomic furniture, "Everyone knows that swivel, tilt, and height adjustments on chairs are not enough. We really must be able to adjust all furniture to meet the needs of the computer user."

As a result, he and other furniture manufacturers have responded by offering adjustable desktops; retractable keyboard trays; and separate shelves for monitors, keyboards, and peripher-

Accessories help to keep the most basic work area comfortable and efficiently organized.

THE RIGHT ACCESSORIES CAN HELP TO KEEP YOU AND YOUR APPLE PRODUCTIVE.

Finishing Touches

For a truly ergonomic work space, consider purchasing computer-support accessories that are designed to keep the most dedicated, full-time Apple user comfortable and productive. You can customize your desk with tilting stands for adjusting monitor viewing angles and augment your chair with a footrest to promote leg circulation, for example.

Some companies offer whole lines of peripheral support products, including hanging cartridges to store printout paper; diskette holders; and mobile carts for transferring papers, disks, and manuals from place to place. Should you find yourself continually straining your eyes and shifting your head sideways to read paper documents on your desk and input data, you may want to invest in a document holder that places the paper on the same vertical plane as that of the display screen.

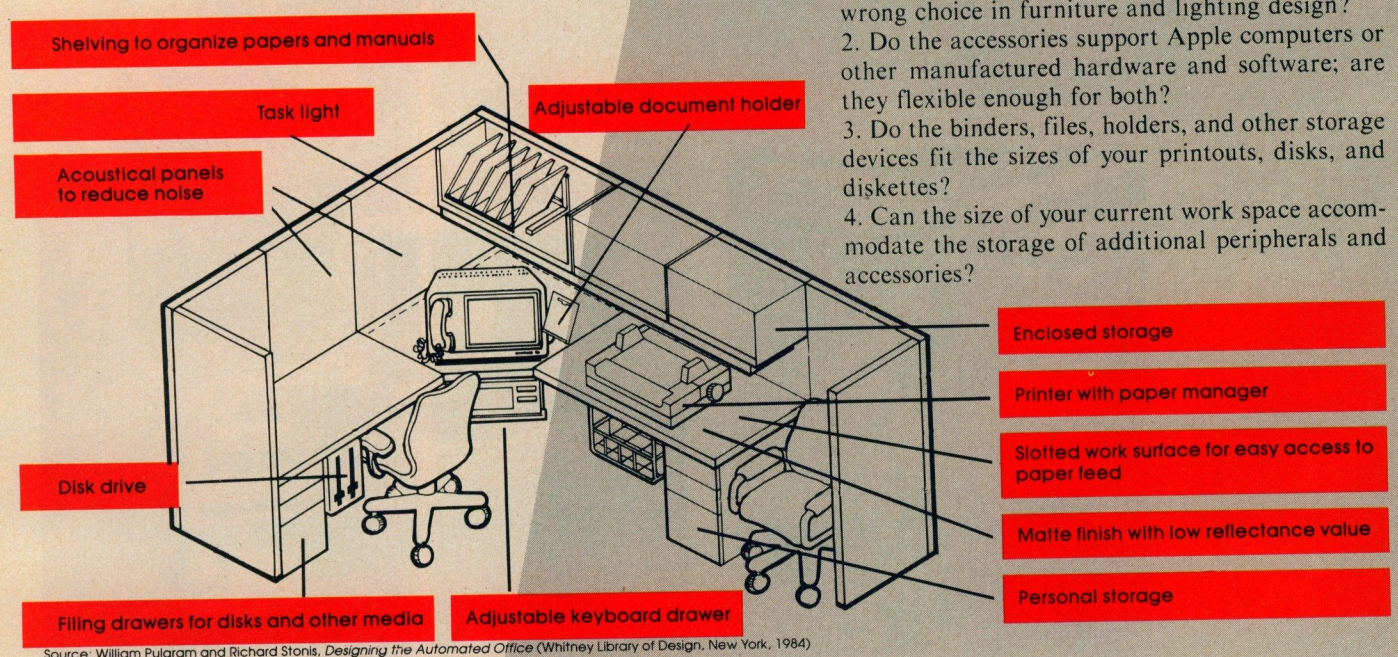
If the clatter of your printer drives you crazy, consider purchasing a specially engineered acoustic housing. In addition to reducing noise, this type of cabinet offers shelving for a variety of printer sizes and baskets in which to store printouts.

Another environmental enhancement worth pursuing is a desktop fan to provide increased air circulation and relief from terminal-heat buildup.

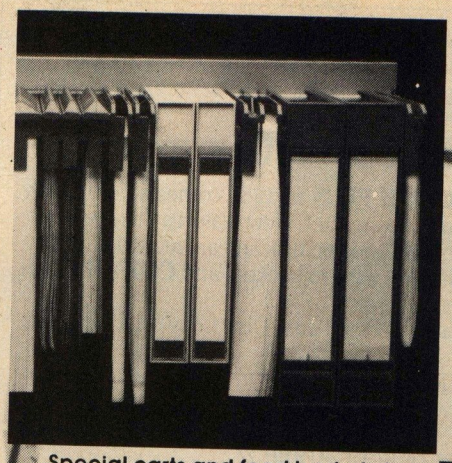
Checklist

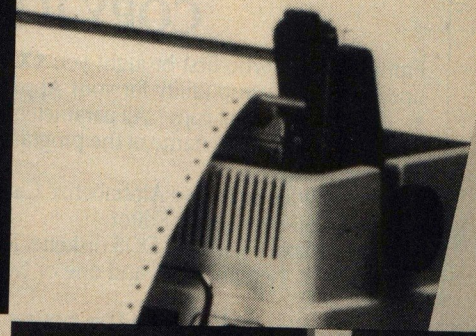
Review this checklist as you shop for related assessories for your work space:

1. Are you buying the accessory to complement your work space or to compensate for an initial wrong choice in furniture and lighting design?
2. Do the accessories support Apple computers or other manufactured hardware and software; are they flexible enough for both?
3. Do the binders, files, holders, and other storage devices fit the sizes of your printouts, disks, and diskettes?
4. Can the size of your current work space accommodate the storage of additional peripherals and accessories?

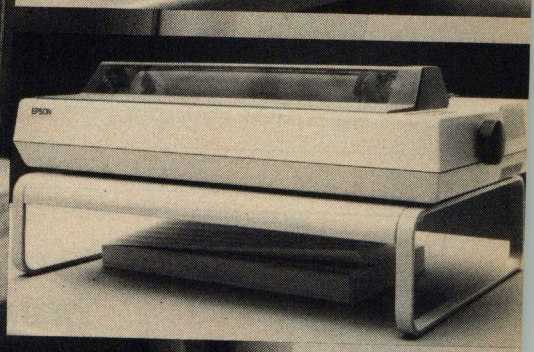


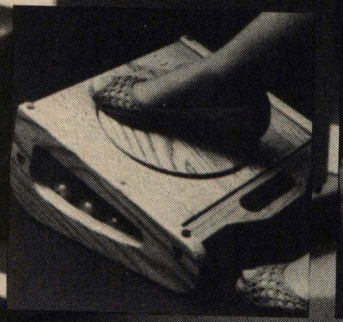
Source: William Pulgram and Richard Stonis, *Designing the Automated Office* (Whitney Library of Design, New York, 1984)

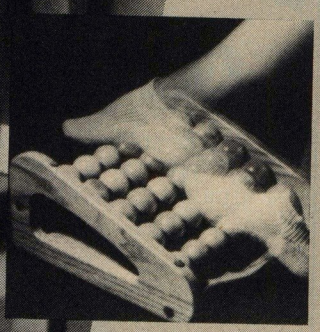


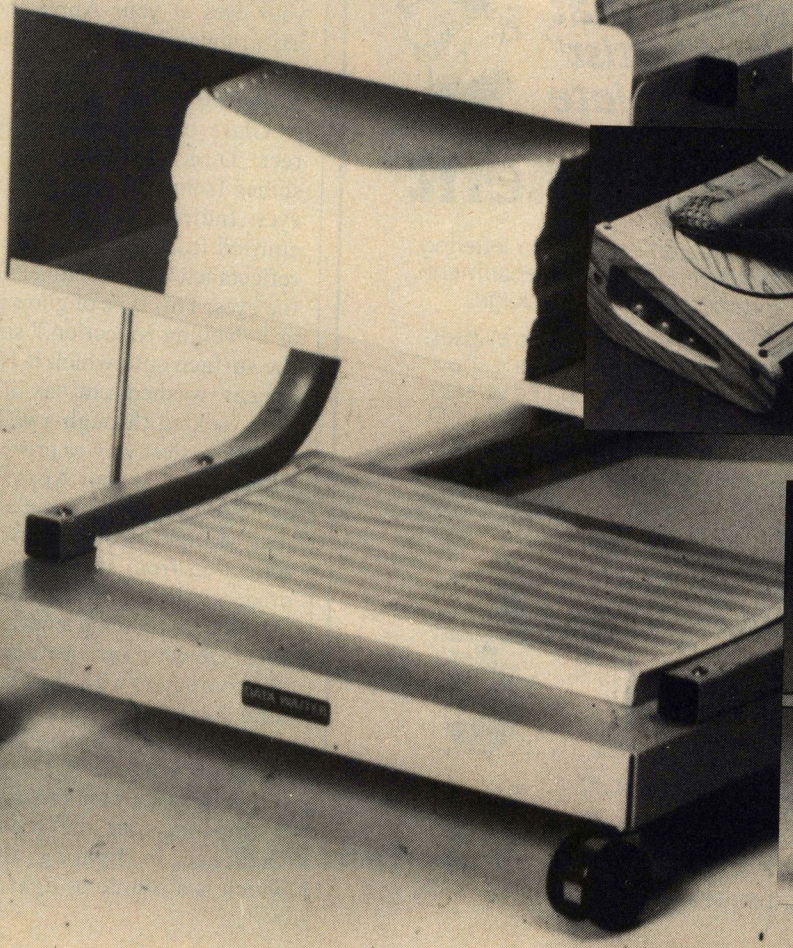


Special carts and feed baskets for printers, such as the Data Waiter from Wright Line *(LARGE PHOTO)* and the Printer Paper Frame from SteelCase, Inc. (Grand Rapids, MI) *(CENTER RIGHT)*, help organize messy and bulky printouts. Noise from printers can be reduced through acoustical housing, such as the printer station with domed hood *(BOTTOM RIGHT)* from C I Designs (Medford, MA). Once printed, paper can be stored in files in binders, or in containers such as the Documate System from Wright Line, which hangs from a shelf *(PHOTOS ABOVE AND LEFT)*. A support to rest your palm while typing from Steelcase *(RIGHT)* and a massager foot rest *(LOWER RIGHT PHOTOS)* from R and R Concepts (Santa Barbara, CA) help improve hand and foot circulation.









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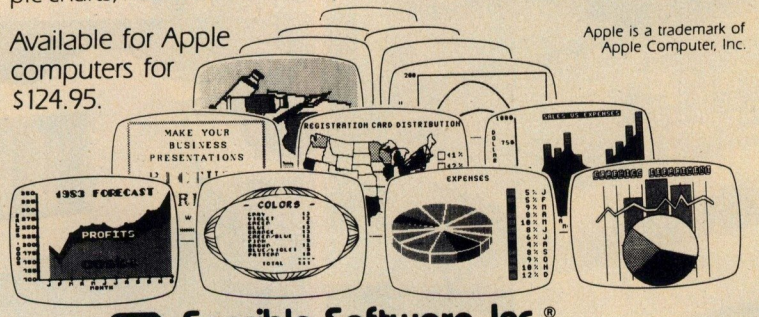

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ergonomics

als. Some experts predict that this furniture will give way to workstations that integrate electronics. Niels Diffrient, for example, has designed a desk prototype for SunarHauserman that incorporates a computer, disk drive, printer, cabling, paper, and disk storage.

Lighting Design

Of the complaints associated with computers, the most common are related to the eyes. Research conducted by the National Institute of Occupational Safety and Health (NIOSH) shows that 91% of the computer operators surveyed reported eyestrain, and 80%

The easiest way to prevent glare is to make sure that your Apple is positioned away from a window.

experienced burning eyes. Many of these visual problems stem directly from harsh lighting that produces glare. If you find yourself shielding your eyes or your Apple monitor from irritating reflections, you, too, may be suffering from glare.

A Glaring Problem

Glare can be either direct or indirect. Direct glare occurs when light shines from a fixture directly into the eyes. Indirect glare occurs when light emitted from one source onto a surface reflects back from that surface and into the eyes. This type of glare is referred to as a "veiling reflection," since it causes the surface onto which it is reflected to appear washed out, as if the viewer were looking through a veil.

The easiest way to prevent glare is to make sure that your Apple is positioned away from a window and away from direct sunlight. You can avoid irritating reflection from shiny and brightly colored ceilings, walls, desktops, and clothing by placing neutral, matte-finished objects and surfaces in front of the computer, with darker finishes behind you to absorb the light.

Crucial to reducing both glare and eyestrain is proper lighting design to illuminate your monitor, adjacent paper documents, and the room itself. The challenge in lighting the computer, which is a source of light in itself, is to

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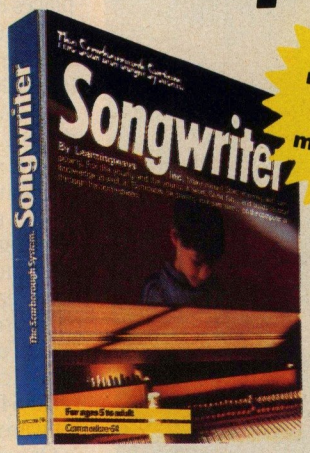

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find a way to balance two different sets of activities: reading printed copy, which assumes a sight line 20 to 40 degrees lower than the horizontal at a distance of 16 inches, while viewing the screen, which assumes a horizontal sight line at a distance of 24 inches from the monitor to the eyes (for a solution to this problem, see "Let There Be [Glare-Free] Light" page 28).

Glare and poor lighting design may not be the only factors behind computer-related eyestrain. Dr. Melvin Schrier, a fellow of the American Academy of Optometry and member of the Illuminating Engineering Society,

A simple way to avoid eyestrain is to take a 15-minute break away from your Apple every two hours.

maintains, "The major reason people have VDT (visual display terminal)-related eye problems is that they have not been tested for this type of work." Both NIOSH and the American Optometric Association (AOA) recommend annual eye checkups for testing of near-point acuity, binocularity, and convergence—visual skills that come into play when you work at a video display. Another visual problem that may plague computer users more than others is presbyopia—*presby* (old) and *opia* (eyes)—a type of reading difficulty that begins to affect people who are 35 and older, involving loss of lens accommodation and decrease in pupil size.

In addition, the eyeglasses or contact lenses that you wear may not be corrected for computer-screen viewing distances. Normal reading eyeglasses are designed for use with a 12-to 16-inch distance between the eyes and the paper; the computer screen requires a distance of 24 inches. Bifocal wearers encounter fatigue by looking from lower (reading) lenses to upper lenses. The AOA recommends that bifocal wearers obtain special multiple lenses for computer viewing, depending on the conditions in their workspace. Filtered prescription glasses that screen out rays provide protection from a video display's ultraviolet light—a leading

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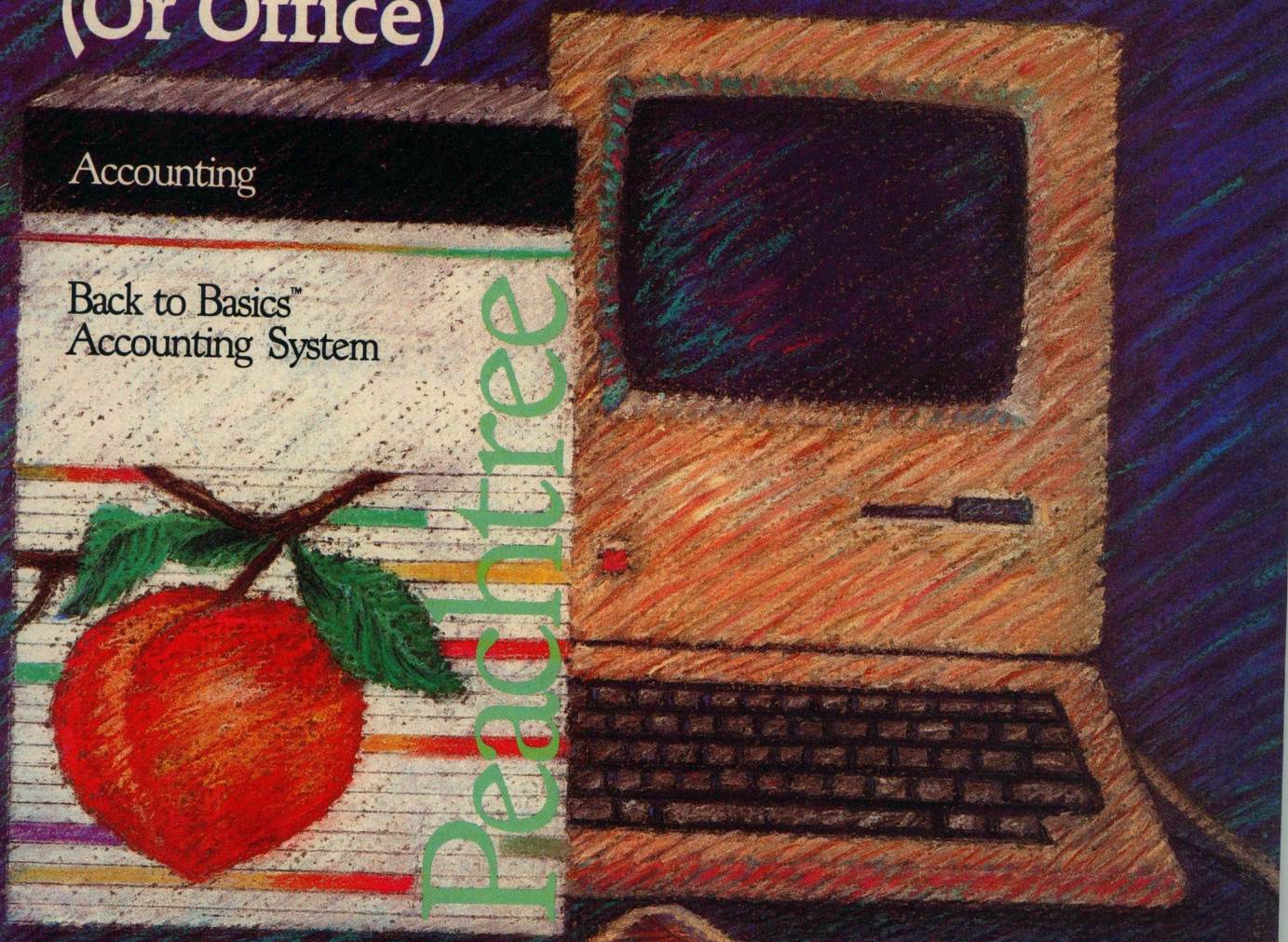

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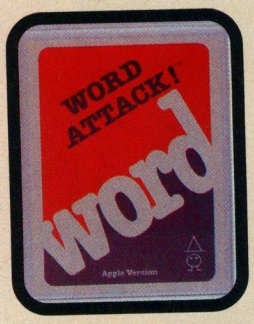

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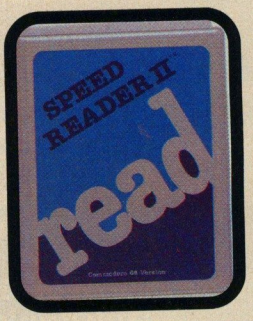

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cause of cataracts and retinal damage.

One of the simplest ways to avoid eyestrain is to take a 15-minute break away from your Apple every two hours, as suggested by NIOSH. Another way is to position the monitor so that the viewing angle is 10 to 20 degress below the horizontal plane at eye level.

Be sure that you properly maintain your Apple in order to ensure a sharp screen image, display contrast, and proper refresh rate. You can cure a computer that flickers during use in a brightly lit room by dimming the room lighting and adjusting the brightness level of the screen.

Don't forget aesthetics when you buy furniture, lighting, or any other computer-support item.

Other factors to consider in setting the scene for your Apple are the environmental conditions surrounding your work area. Room humidity should be within the 40–60% range. Air that is too dry generates static electricity, which can interfere with a computer's electromagnetic field, and air that is too moist can be detrimental to disk and paper storage.

Be sure your work area is adequately ventilated to cope with the heat output from your Apple. Fresh-air circulation is important to prevent the buildup of airborne toxins from common materials such as plywood, particle board, and foam insulation, all of which give off formaldehyde, a cause of skin, eye, and respiratory irritation.

Finally, don't forget aesthetics when you buy furniture, lighting, or any other computer-support item. No matter how ergonomic they are, you probably won't use them if their designs are completely at odds with your decor and sense of well-being. Don't hesitate to consult a local architect or interior designer for information on how to order the latest products. Remember, beauty may lie in the eye of the beholder, but comfort keeps the eyes open and bright. ✚

Deborah Dietsch is a free-lance journalist who frequently writes about the design of the automated workplace.

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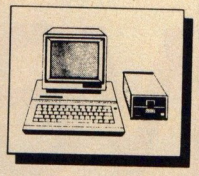

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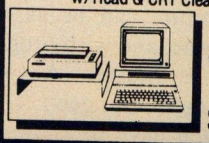

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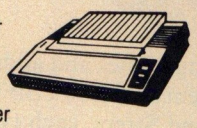

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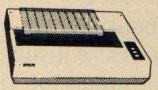

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Before setting out to design a new world, however, you should know a bit about how an adventure game actually works. All such programs store the descriptions of their caves, castles, and characters in a database. When you type a command such as open chest, a group of formulas called the parser analyzes the words, consults the database, and displays the appropriate description or reply. Each of the programs we'll look at asks you for the names and descriptions of everything in your adventure, and then it automatically generates the necessary database. You can revise its contents at any time, which is why this kind of program is often called a database editor. To examine these editors thoroughly, I used each one to design a different version of an adventure I called Quest for Hoffa.

Adventure Master

This program simplifies the construction of adventures in which you can depict some rooms with three-color graphics as well as with text. You use a joystick or the keyboard to draw the pictures and enter textual descriptions, room connections, and other information via one of the main menu's ten other options. After selecting an option such as Edit Objects or Room Description, you type the number of the room you want to edit, and the appropriate screen appears and prompts you for information.

The process resembles that of entering names and addresses in a filing system such as PFS:File. Instead of Name and Street, each type of data (Description, Needed Object, Key Phrase, and so on) appears on the screen, followed by a blank area where you key in the text. To change a previous entry, you merely type over any existing material. The same data-entry scheme facilitates adding new commands that the program will understand if a player uses them in the game. (Eighteen commonly used commands such as Look, Take, and Save Game are already built in.)

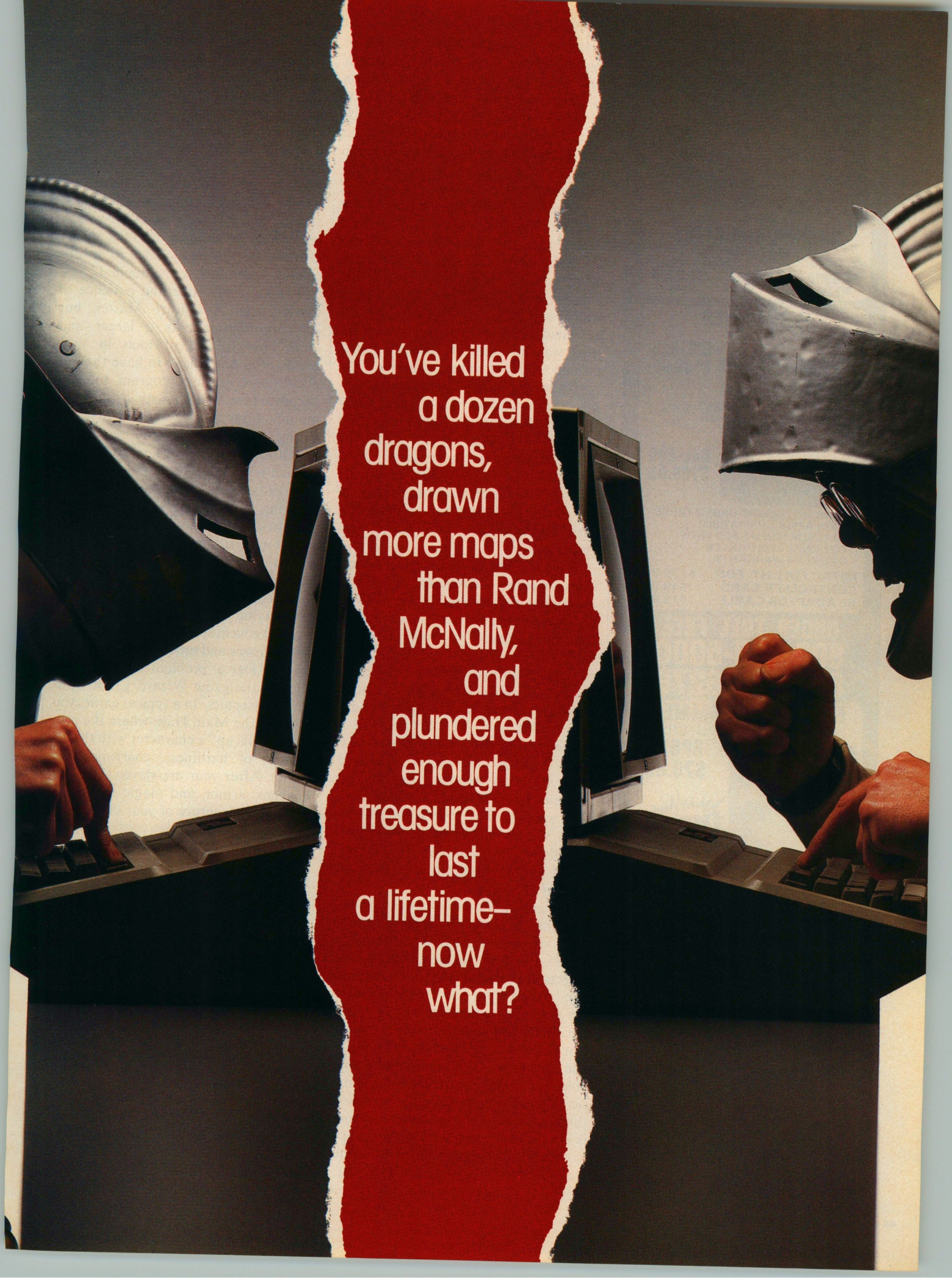
After you've filled a screen in, you have the choice of erasing it and starting over or saving it on the disk that will hold your new game. The Test feature lets you play the game in its current state and then return to the editor to make changes. You can save your work in progress to disk at any stage. When the game's done, Adventure Master saves it in a format that can run independently, so your friends won't need the editor to load and play your game.

The final product won't be as expansive as other adventures created with similar programs, because Adventure Master limits your world to 50 rooms (more if fewer than ten are illustrated), 32 objects, and 50 to 100 commands with individual text responses. It also places more restrictions on how you incorporate these elements into a game. You can put only one object in each room, for example, and each object must form a puzzle in itself. When adding a shovel to a room, I had to type in a phrase that hinted that an object was hidden there. Then I specified the words and/or objects the player had to use in order to discover and obtain it.

A good adventure game should contain at least one dark cave or room in which the adventurer needs a torch or lantern to see its contents. Unfortunately, Adventure Master provides no method for checking to see if a player is carrying a light source. I found a way to achieve this effect, but not as well as I wanted. Other minor limitations cropped up as I tinkered with the editor, but the most frustrating—to me, anyway—was that there was no way to kill a player who walked off a cliff or did anything else that ought to be fatal.

Adventure Master was the easiest of the three programs to learn and operate. The 25-page manual offers clear instructions and examples for each phase of game development. The package includes three sample adventures, and you can scrutinize their databases for examples of effective ways to apply the various features. Two of the games

CURT FISCHER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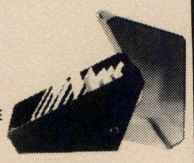

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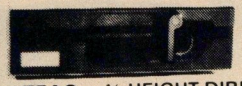

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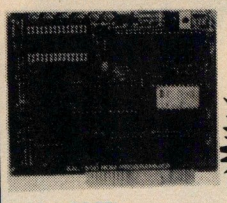

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have no endings, and you can learn a lot by completing these before starting a new one from scratch. This option makes this program especially well suited for teenagers as young as 14 and for families who want to collaborate on new games for other family members to play.

AdventureWriter

AdventureWriter is a more complex program than Adventure Master, and thus it took me longer to write Quest for Hoffa with this program. The extra effort paid off, though, because I was able to invent problems based on a wider range of questions: Had the player visited a certain room, how many objects was he carrying, had he found enough food and water to survive?

AdventureWriter automatically checks to see if the player is carrying a light source, and I finally got to waste the careless adventurer who stumbled off that cliff. Another handy feature lets you print out hard copy of any section of the database to produce a list of all the locations or objects, for example.

Each element of a new game—locations, objects, vocabulary, conditions, messages—is continued in one of 17 individual submenus that you access from the main menu. The trickiest part is learning the 36 code words that indicate the conditions under which certain events will occur. Under the command examine shovel, for example, I had to key in this line: AT 3 MESSAGE 5, which means that if the player is in room 3 (where the shovel is located) when he types examine shovel, then message 5 (which describes that item) will appear. The initial vocabulary holds 30 common words, which you can edit, delete, or reinforce with your own nouns and verbs until you reach the limit of 255 words.

AdventureWriter games can have as many as 252 different places with up to 255 objects scattered throughout them—I had no trouble placing several objects in the same room. The database also has space for 255 messages, which are displayed when the player fulfills the conditions you prescribe. You can edit or delete any existing entry and/or add new ones. Graphics are not available, but I added sound effects and music by picking notes from the program's three-octave range. (The manufacturer is working on a new version with graphic capabilities so you'll be able to illustrate the rooms.)

The 115-page manual steps you through a tutorial adventure in which you write a small game, and the reference section explains the code words and every other aspect of the system. It fails to provide the correct instructions for the unconventional method with which Apple IIc users must format a disk for use with the program, though. The company maintains a toll-free hot line for technical problems such as this, and my query found a quick answer. A representative assured me that proper instructions will be included in an upcoming addendum to the manual.

It takes more time and patience to master than Adventure Master, but AdventureWriter puts a larger and more powerful set of tools in your hands. You don't have to have the application-generating program to play an adventure written with it, and the manufacturer assists authors in marketing well-written adventures.

AdventureWriter is appropriate for anyone who has solved several adventure games—the same kind of logical thinking and attention to detail you need to solve adventures are a prerequisite for writing the more-complex games this system can produce.

Eamon Dungeon Designer

Eamon is a public-domain fantasy/role-playing game that differs from traditional adventures by focusing on combat with orcs and other monsters rather than on logical problem solving. It resembles the game Wizardry, but without the graphics. In a typical game, you begin in the Main Hall, where the program "rolls up" a character with the attributes of hardiness, charisma, and agility. After your orc-slayer shops for weapons, armor, and magic spells, it's off to the adventure of your choice.

Eamon's action consists mostly of typing commands such as Attack dragon and reading the results of your attack and the monster's immediate counterattack. The goal of each game is simply to increase your character's attributes by victory in battle and to collect as much loot as you possibly can. (You can store characters on the disk and revive them for use in different adventures). A game called Beginner's Cave is included on the master disk, which you need in order to play any Eamon adventure.

On the flip side of the master, you'll find the Dungeon Designer. Like the other editors, this one consists of several menu-driven phases in which you lay out rooms and place objects, monsters, and effects within them by typing in the

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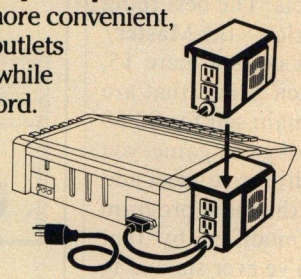

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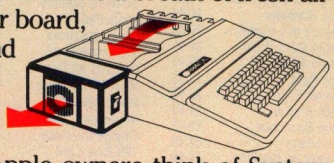

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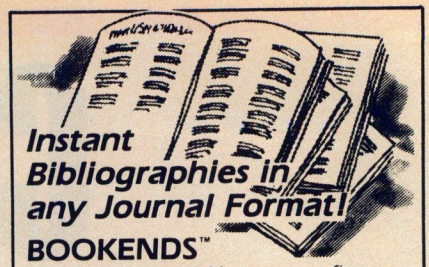
appropriate information. You can easily assemble a relatively simple role-playing game with a maximum of 100 of any of the 4 elements: rooms, monsters, effects, and objects. It delivers hard copy of any part of the database, and several utility programs are available to considerably reduce the amount of work you'll have to do.

The system's most annoying aspect is that the main menu's items represent different programs, which are loaded individually when you select them. After finishing with the Edit Dungeon Data option, for example, you must reboot the main disk in order to access other options. The documentation is stored on the disk as text files that can be displayed on the screen, but it doesn't cover the system's numerous idiosyncrasies and special features in detail. (Serious dungeon designers should consider joining the National Eamon Users' Club.)

Unlike the other editors, Eamon gives you access to the main program that actually runs the game. With a minimal foundation in Applesoft BASIC, you'll be able to design more customized games with a wide range of special effects. This knowledge is necessary if you want to alter the existing 30-word vocabulary, for instance, or invent your own special effects. The best thing about Eamon is the price—the Master/Dungeon Design disk costs a mere $5, and the 81 user-written games that are also in the public domain sell for $2.50 to $5 each. After playing one game, you can load it into the editor to dissect and study it and then list the main program to see how it was modified by that game's author. If you've ever started to learn BASIC but got bored with the sample programs, try Eamon—it gives you something *fun* to do with BASIC.

If you plan to learn programming anyway, don't dismiss the thought of using one of these editors. Working with such a program provides a painless way to absorb the principles of programming. You'll soon recognize the value of designing a game on paper before booting the editor, which is the equivalent of writing a program's flow chart. Matching possible words and commands with the conditions required for them to cause specific effects is the same as writing IF THEN statements in BASIC.

In short, the logical thinking fundamental to designing a game with a database editor also forms the basis of programming in any language. Even if



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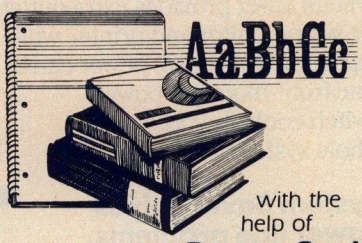

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you already know how to program, an editor lets you put an idea up on the screen quickly and see how it plays without having to punch in a lot of code.

If you're just one of the many adventurers who has always dreamed of conjuring up your own exotic fantasy world but felt locked out by a lack of programming skills, one of these programs is the key that will unlock the door. Best of all, you can freely give away or even sell the games you create with any of them—just don't expect to run Infocom out of business. ✚

From a tastefully appointed cave in Valley Forge, Pennsylvania, Shay Addams publishes QuestBusters, *a monthly newsletter devoted to adventure and fantasy/role-playing games. He is also coauthor (with Dan Gutman) of* Compute!'s The Greatest Games: The 93 Best Computer Games of All Time.

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Eamon Dungeon Designer
Because it's in the public domain, the Eamon Master/Dungeon Designer system is available from most Apple users' groups and many other sources. Two of the best are National Eamon Users' Club, 2701 Arnold Road, Des Moines, IA 50310 (the only place you can count on for help with the system) and Adventure-Disk, P.O. 216, Mercer Island, WA 98040 (publishes an adventure newsletter on disk, which includes a free Eamon game with each issue)
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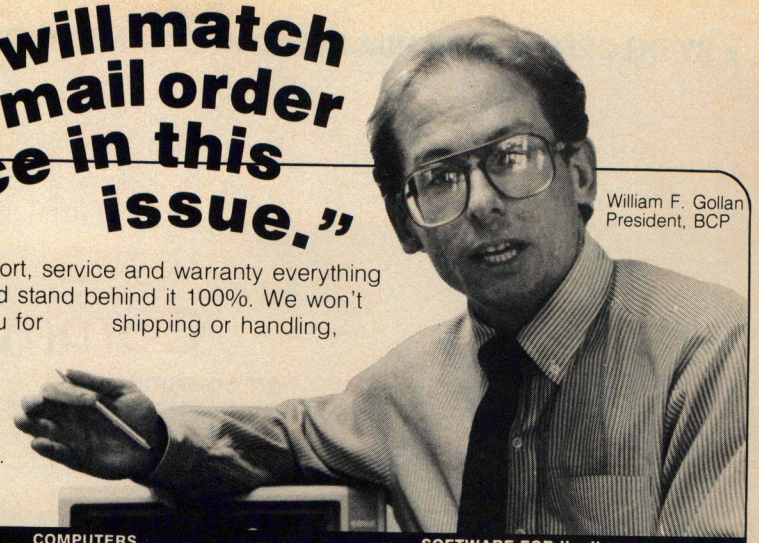

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In order to keep Apple III owners up to date, we are publishing a three-part list of software currently available for the Apple III. This is part three.

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extensive

The first part of a four-part tutorial on using the language of the LaserWriter printer

Speaking POSTSCRIPT To The LaserWriter

Would you like to see what you can do with Apple's new LaserWriter printer? If you would like your computer to talk to the LaserWriter, the conversation has to take place in the PostScript typesetting and graphics language.

The PostScript language, which was written by Adobe Systems and licensed to Apple, is built into every LaserWriter. You can send the LaserWriter a PostScript message from an Apple II, a Macintosh, or from any other computer with an RS-232 serial port. In addition, any AppleTalk-equipped computer can connect to the LaserWriter through the AppleTalk network.

Writing the PostScript statements that make the LaserWriter produce the output you want is a form of programming. In this series of articles, I'll attempt to present the basic principles, structures, and commands you'll need to understand the way PostScript programs operate. If you have access to a LaserWriter, with the help of this series and perhaps the PostScript manual, you may want to try writing some PostScript routines of your own.

If you *don't* want to program in PostScript, you don't have to learn to do so just to use a LaserWriter. Apple provides a general PostScript printer driver for the Mac, and many software houses are including PostScript printer drivers in their upcoming application programs. Whether for intellectual exercise, a need for better control, or just for fun, you may want to find out what PostScript allows you to do, however.

PostScript is a stack-oriented language, keeping its working values, definitions, and intermediary results in a set of ordered lists. It is more like Forth than like BASIC or Pascal. In general, it uses values and objects immediately or it pushes them onto a stack. When the program needs data or encounters a command to retrieve a value, it pops a value back off the top of the stack again (see figure 1).

PostScript is also an extensible language, meaning that you can define routines in terms of basic PostScript operations and then use these new terms as part of further definitions. When the LaserWriter interprets your PostScript program, it follows each new term back through your definition until it reaches a description made up of primitive operations that it knows how to perform (see figure 2).

As a complement to the threaded-stack structure of the language, most PostScript operations are written in postfix—you first list the objects you want to use, and you then say what you want to do with them. For example, to add 3 and 4, you write

```
34 add
```

rather than the

```
3 +4
```

infix form you would use in BASIC or ordinary math. This procedure makes it possible for PostScript to evaluate objects according to a set of simple rules, although it does make the programs harder for beginners to read and write.

In general, PostScript works its way through a program as follows. As the computer reads each set of symbols, PostScript figures out where the breaks are between the words and assigns each group to a logical unit called a token. As soon as a token becomes available, PostScript looks to see what type of object it represents.

If the token is a number, PostScript saves it for later use by pushing it onto the operand stack. It does the same for definitions and specially marked command routines intended for later use. If, on the other hand, the token is a name, PostScript checks to see if it represents an executable routine or a primitive operation. If it does, the language executes the statement, pulling as many values off the stack as the operation requests and returning any results back onto the stack.

The basic scheme, then, is first to define any new terms and push them onto the stack. You then supply the values you want the program to work with. Finally, you give the commands that will retrieve the values, do the required arithmetic and logic, and print out the result. In practice, it's slightly more complicated, and we usually alternate between adding values to the stack and popping them back off.

We'll get to a concrete example in just a moment, but first let's take a short detour into the way PostScript handles stack operations. PostScript actually has four distinct stacks: operand, execution, dictionary, and graphic states (see figure 3). A different class of operations affects each stack.

The operand stack is much like a piece of scratch paper or the running total on a calculator. If an operation

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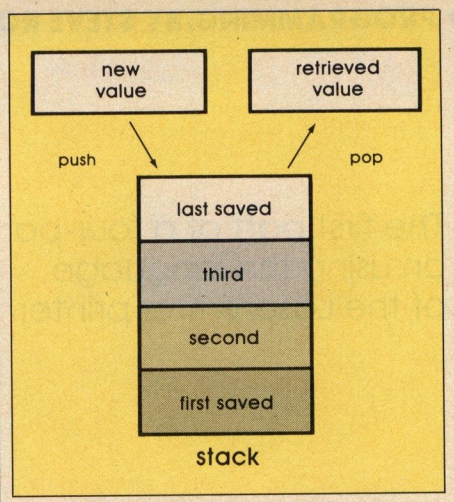

Figure 1: PostScript stores its working values by pushing them onto and popping them back off an ordered list called a stack. The last item saved is the first retrieved.

needs input values, it pops the required number of values from the operand stack. Similarly, any results produced go back on the stack for later use. This holds true for both arithmetic operations and those that handle text.

The execution stack is where PostScript stores away your program. Normally, you don't explicitly work with this stack but let PostScript do the stack management as it works its way through your program.

The dictionary stack lets you create new definitions and save libraries of procedures. PostScript searches this stack for your definitions, then for built-in operations, and flags any terms that it can't find in either.

Finally, the graphics-state stack is a holding area for sets of parameters that define how the PostScript language interfaces to a specific printer or interprets the exact graphic commands in your program. PostScript can keep track of several sets of parameters, which makes it possible temporarily to alter graphics characteristics in order to draw certain objects and then return to the original mode.

The Simplest Possible Program

We've done enough theory to start now with some practical examples. We'll begin with the simplest useful PostScript routine,

```
copypage
```

a one-line program that tells the LaserWriter to produce a printout of the current page. Because we haven't said to write anything on the page and the LaserWriter assumes a blank white page to begin with, this routine will simply eject an empty sheet of paper.

The dictionary stack lets you create new definitions and save libraries of procedures.

Next, we'll make the routine a bit more complex. Suppose we want two blank pages. The routine then becomes

```
2{copypage}repeat
```

and PostScript, as it reads this line, first encounters the 2. Remember, PostScript pushes values it encounters in the input stream onto the operand stack until they are needed. So the 2 is pushed onto that stack.

Then, PostScript finds {copypage}. Curly brackets tell PostScript that it should save the enclosed commands, rather than execute them. The program treats deferred commands as a special form of text input—as operands to be saved on the operand stack until they're called for. That's what happens to the {copypage}.

Proceeding along, PostScript then finds the repeat. Repeat is a word that it understands as an executable command that takes two operands. Going back to the stack, repeat treats the object on the top of the stack as a sequence of commands to execute and the next object on the stack as the number of repetitions to make.

The object on the top of the stack is

TRY IT YOURSELF

If you have access to a LaserWriter and want to try some PostScript examples, here is the procedure. You need your computer, an ordinary communications program (such as Access II or MacTerminal), and either an RS-232 serial port or AppleTalk. If you use a serial connection, set your communications parameters to 8 data bits, 1 stop bit, no parity, and the X-ON/X-OFF protocol. You can use 1200 bps (set the Mode control on the LaserWriter to 1), 9600 bps (Mode 2), or AppleTalk (Mode 3). Send the LaserWriter a Control-D to stop any current job, a Control-T to have it report the job's status, and the Executive command to tell it to echo back commands as it receives them. Then, enter your PostScript programs.

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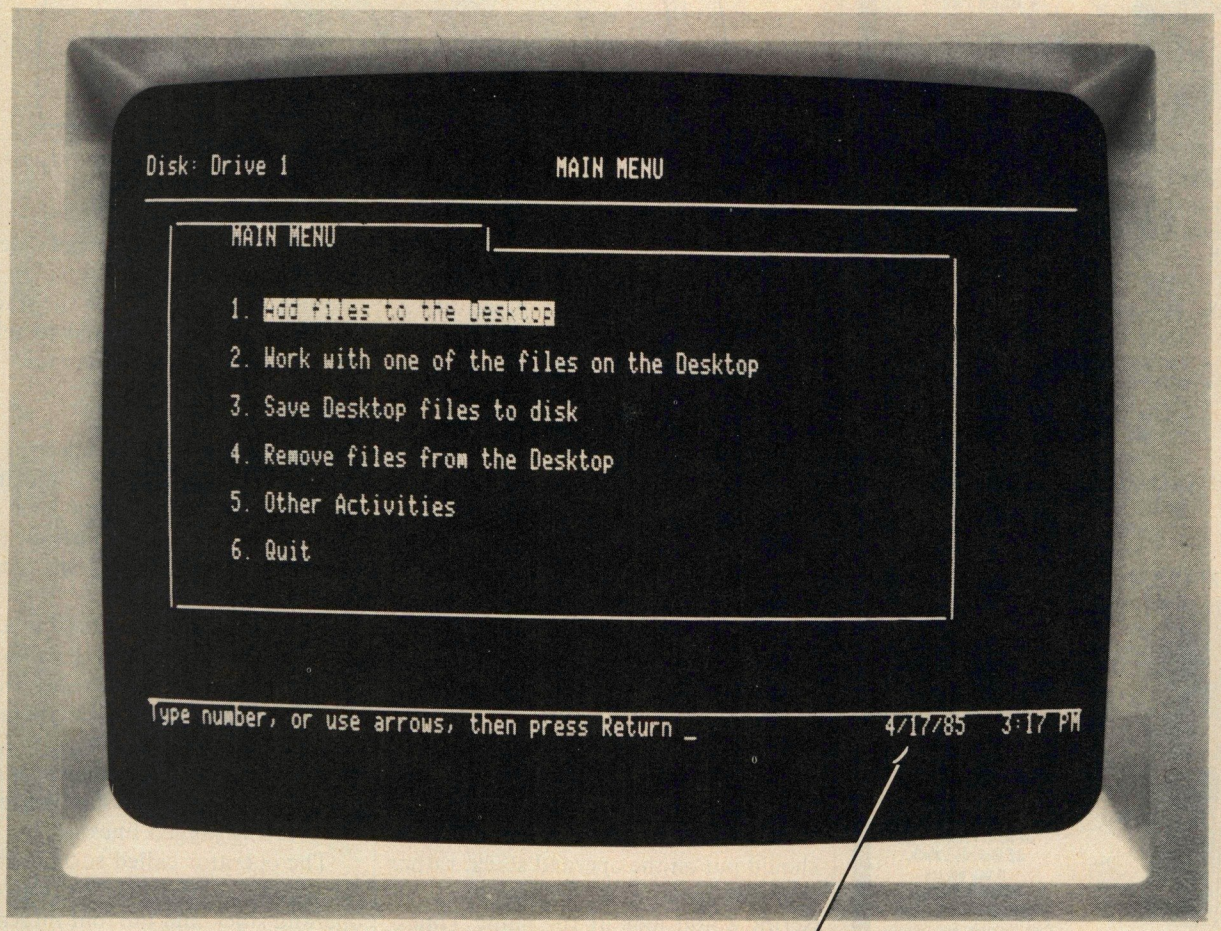

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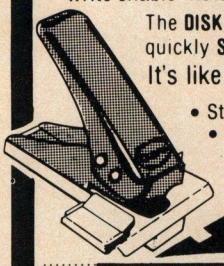

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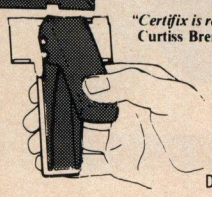

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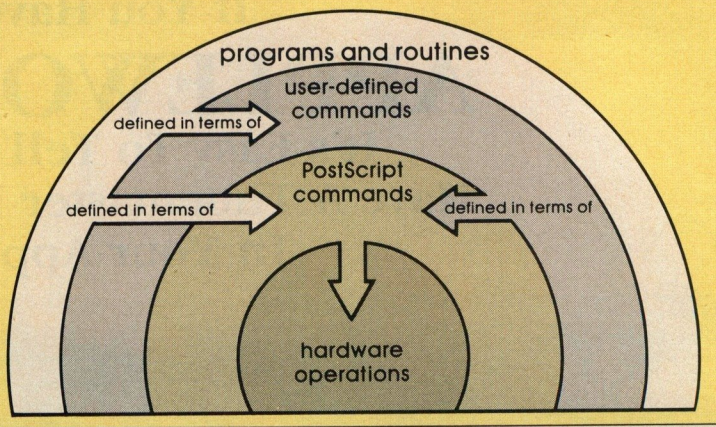


Figure 2: You can add your own definitions to the existing PostScript command set and use both existing commands and your new ones in further definitions or routines.

copypage, which still prints out the current page. The next object is the repeat factor, which in this case is 2. The LaserWriter responds by printing two blank pages.

Now, we'd like to add some text to the page. In order to do so, we'll have to gather up some more PostScript tools. To print text, we'll need to use fonts, arrays, and a positioning command.

Before PostScript can place text within a page image, it has to know what type style and size you want to use. For this example, let's use Times Roman.

The first token in our statement is

```
/Times-Roman
```

which is the name of the font, preceded by a slash. The slash tells PostScript that Times-Roman is a name that it should put on the operand stack, rather than interpreting it. Otherwise, PostScript would look at the name Times-Roman, decide that it wasn't a built-in command or a word already defined, and flag it as an error.

With Times Roman on the stack, we can then issue a command to select it for use. Our line then becomes

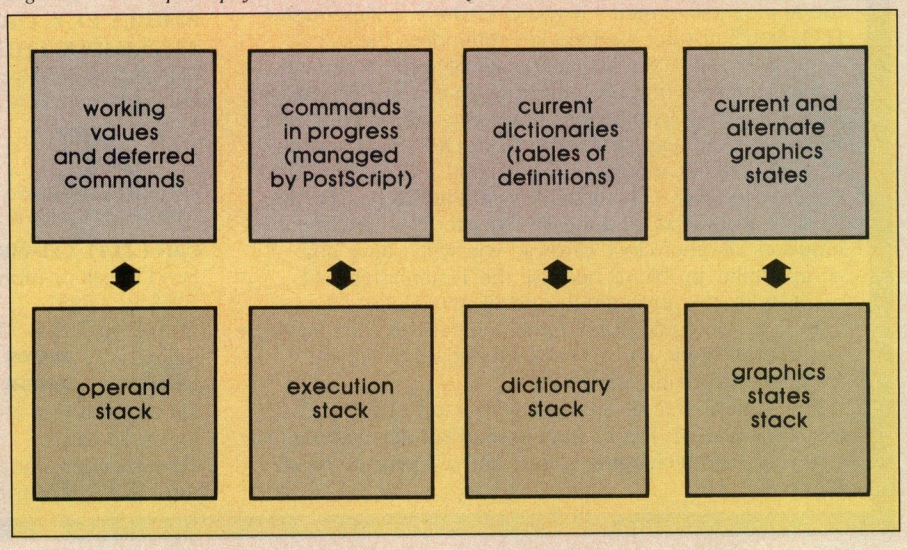
```
/Times-Roman findfont
```

and the findfont tells PostScript to locate the dictionary of information about the font whose name is on top of the operand stack and push all the information about that font onto the operand stack.

Fonts are generally stored in a reference size, rather than in the actual size of letters that we'd probably want to use. PostScript uses a one-point-high font as the reference (about 1/72-inch high), which it can do because it is able to scale fonts smoothly up in size without creating jagged lines.

The operator called scalefont takes the scale factor from the top of the operand stack and the font information from underneath it. We've set the font

Figure 3: PostScript keeps four active stacks, each of which it uses to store a different type of value.



name, but we need the number. To put a number on the stack, we include it in a command as a separate token. Putting these elements together, we get the command

```
/Times-Roman findfont 12 scale-
font
```

Finally, with the font all specified, we add one more command to make it the current font, until further notice.

The first lines now read

```
/Times-Roman findfont
12 scalefont setfont
```

Now that we have a font, the next step is to specify where on the page we want the typing to start. The most basic positioning command in PostScript is moveto, which tells the LaserWriter which point on the page to use as the starting point for further graphics or text commands.

Naturally enough, since a page is two-dimensional, moveto takes two numeric values as its inputs. In stack-language form, the two values must be on the stack already when we execute the moveto. The command line to start at halfway up the page, about an inch from the left margin, is 72 396 moveto, with 0,0 at the bottom left of the page and 72 units to an inch.

In PostScript, the operator to place text on the page image is show, which takes a string for an input, places the characters on the image, and advances the current location point as it goes. The string input, as you've probably guessed, must first be placed on the operand stack.

Strings in PostScript are made up of sequences of characters. We can create these sequences with operators, or as literal elements. We'll start with literals. You set strings off by enclosing them in parentheses. Our text string is, therefore

```
(This page intentionally
not left blank)
```

and the command to place the text on the page

```
(this page intentionally ) show
(not left blank) show
```

These two lines will print as one—I broke them here to fit the magazine's column width. That gets the print on the image, and we already know that it is put on the paper with showpage.

It took quite a bit of doing, but we now have a complete PostScript program. To print our single line on the page, we run the program

```
/Times-Roman findfont
12 scalefont setfont
72 396 moveto
(this page intentionally) show
(not left blank) show
showpage
```

That's enough instruction to get you started. We've seen that PostScript is a stack-oriented language, and we've worked a little bit with the stacks. We've written a short program and seen the very basics of how to get an image on a page. On the way, we've run into commands, deferred commands, arithmetic, strings, arrays, and graphics. And we've gotten the printer actually to spit out a printed page.

Next time, we'll take a closer look at the PostScript graphics commands and what we can do with them. Following that, we'll go back to text in more detail. Finally, in the last installment, we'll look at how to use PostScript in application programs. Stay tuned. ✚

Steve Rosenthal is, among other things, an ex-typesetter, ex-printer, and ex-taxi driver. He's currently an A+ consulting editor.

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CIRCLE 338 ON READER SERVICE CARD

They're not cropping up in every forest the way they used to, but you still have a range of choices.

COMPUTER CAMPS

No, you don't *have* to send your children to a computer camp to ensure they'll survive the high-tech 80s, but if you want to make them more comfortable with computer tools, a good computer camp can teach them that computers are not only useful but also fun.

You don't see computer camps cropping up in every forest the way you used to.

▶ Think about what you're looking for first and then search out a camp that offers it.

A couple of years ago, computer camps were the latest craze in children's summer diversions. They were billed as the only way to ensure that budding executives-in-the-rough would be able to comprehend the world of the future.

Now, however, the fad has faded, as children work more with computers at home and at school and the computer mystique is dispersing on its own. There's still a place for computer camps, though, whether your son or daughter craves an intensive "computer experience" or simply wants to work with computers as part of a more traditional camping session. Computer camps are rarely cheap, but what camps are? The object is to have a good time and learn.

What Is a Computer Camp?

The term "computer camp" is bandied about in classified ads as much as the term "user-friendly." If you're a parent contemplating sending a child to computer camp, it behooves you to think about what you're looking for first and then search out a camp that offers it, as you would with software.

Many traditional camps advertise computer facilities and instruction as an adjunct to their regular offerings of hiking, swimming, team sports, and crafts. Let the buyer beware here. You probably won't find computer instruction emphasized in this kind of setup; it's more likely to be an elective activity. Fine, if that's what you want, but don't expect computers to be the main event.

Look out for the other extreme, that of excluding everything else for the sake of grinding away at the computer. The weighting of different activities is a minor bone of contention among camp directors, some of whom say camps that don't balance computer instruction with a near-equal amount of recreational activities are "clinics," not camps.

Mark Zacovic, executive director of ExperCamp (formerly The Original Computer Camp), says, "We don't think the hacker life-style is a balanced one," and adds that ExperCamp goes out of its way to provide well-rounded role models for campers, "not the pale, bespectacled, greasy-haired" classic computer nerd.

Michael Zabinski of National Computer Camps, on the other hand, scoffs at that style of computer camp, saying that "computer camps in the woods are 'pie in the sky.' " He believes that ten-year-olds can't get a good grip on assembly language in an environment "not conducive to concentration."

An interesting middle-of-the-road approach is available at places such as the Arizona Computer Camp, where the children work directly with computers part of the time and, during their outdoor activities, gather environmental data they use while learning to program.

I'll stay out of this controversy and simply point out that the academic style of computer camp is available if you want it.

What to Look for in a Camp

Hidden costs. In the chart that accompanies this article, I've tried to list the complete cost for each session at a camp, including any diskettes, lodging, food, or field trips. Some camps charge extra for diskettes that children can take away at the end of camp, for instance, or for commemorative camp T-shirts. Find out how much everything costs, not just the instruction.

Types of computers and the ratio of computers to campers. The chart lists only camps that use Apple equipment, of course. Some camps deliberately utilize a mixture of equipment, so that campers won't be tied to one brand of computer. Other camps deplore that tactic and say it doesn't provide in-depth learning. Decide for yourself, based on what you learn about the curriculum.

▶ The teamwork children develop when they work together increases what they learn.

Most camps aim for two students per computer. They reason that although a one-on-one relationship with a IIe is alluring, the teamwork children develop when they work together actually increases what they learn, since the kids

can ask each other questions, rather than depend on the teacher alone. Having a computer for every camper isn't a detriment, either, and each child may get more hands-on time.

Computer staff. Who does the real teaching? Is it certified teachers with computer-education experience, teachers who underwent computer training before the camp started, or graduate students in computer science? Jacqueline Massing, camp director at Silicon Valley Computer Camp, argues in favor of computer-science graduates and undergraduates as instructors, saying they're easier for children to identify with and are also "much more up to date and aware of games and computer languages." (Silicon Valley Computer Camp also uses certified teachers, however.) Many camps pride themselves on using only certified teachers steeped in computer instruction; almost every camp employs less-experienced teachers' aides to lighten the work load, though.

Be sure to include your child's level of interest in your calculations.

Computer curriculum. Here's the heart of the issue. A one-to-one camper/computer ratio is meaningless if the instructional materials are vapid and weak.

Question camp directors most closely on this point, and don't forget to include your child's level of interest in your calculations: after all, intensive computer instruction eight hours a day will only bore or disgust a child with moderate curiosity in the subject.

Find out how the material is taught. Some camps rely on the instructor to transmit every drop of knowledge; others use self-programmed workbooks and a lot of solo time. Here the literature is thick with buzz-words such as "indi-

CAMERON WASSON

▸ BY VANESSA SCHNATMEIER

COMPUTER CAMPS

Computer camps are located in the western, central, and eastern U.S. The chart below includes the complete cost for each session at each camp, including any diskettes, lodging, food, or field trips. All of these camps use Apple computers, but not necessarily exclusively. Note the variation in time the campers spend with computers each day and the other kinds of activities each camp provides.

CAMP	SESSIONS	TUITION	AGE GROUP	CURRICULUM	COMMENTS
EASTERN STATES					
NATIONAL COMPUTER CAMPS P.O. Box 585 **Orange, CT 06477** (203) 795-9667 (various locations)	1- or multi-week sessions, June 23–Aug. 2, resident	$395 per week	Coed 9–18	BASIC, Pascal, assembler, word processing, graphics, robotics	Locations in Simsbury, CT; Atlanta, GA; St. Louis, MO; Cleveland, OH; Baltimore, MD. Some scholarships through school systems. 5 hours per day on computer, up to 5 hours more optional. "Concentrated effort in prep-school environment."
TAR HEEL CAREER CAMPS P.O. Box 2328 **Chapel Hill, NC 27514** (919) 967-6996	2 1-week sessions, July 1–12, resident	$350 per session	High school juniors and seniors	BASIC, Pascal	Tours of local computer facilities, schools. Four hours per day on computer.
TIC COMPUTER CAMP 4620 Dittmar Road **Arlington, VA 22207** (703) 241-5542	4 2-week sessions, June 21–Aug. 16, day	$310 1 week, $555 2 weeks, $800 3 weeks, $1025 4 weeks	Coed 7–16	BASIC, Logo, Pascal, assembler, LISP, C	3 hours per day on computer, 3 hours in athletics.
VIRGINIA TECH COMPUTER CAMP 400 War Memorial Gym Virginia Tech **Blacksburg, VA 24061** (703) 961-4850	2 2-week sessions, June 30–July 21, resident	$675 per session	Coed 10–17	BASIC, Pascal, assembler, optional languages, graphics, robotics, AP exam track	Emphasis on learning to program and solve problems, "fun but academic." Field trips to academic and computer labs.
CENTRAL STATES					
CAMP EDWARDS YMCA Box 16 **East Troy, WI 53120** (414) 642-7466	9 1-week sessions, June 22–Aug. 17, resident	Range from $182 to $197 per session	Coed 9–15	Literacy, BASIC, games, "Apples at work," basic programming	4.5 hours per day on computers, balance of outdoor activities
LAKE FOREST COMPUTER CAMP Lake Forest College **Lake Forest, IL 60045** (312) 234-3100, ext. 312	6 1-week sessions, June 16–Aug. 9, resident	$390 per session	Coed 10–16	Mac BASIC, Pascal, BASIC, assembler, graphics	Heavily academic, 6.5 hours per day of computer instruction, regular recreation hour in afternoon.
UNIVERSITY COMPUTER CAMPS OF AMERICA 2480 Crooks Road **Troy, MI 48084** (313) 362-4499	5 2-week sessions, June 16–Aug. 24, resident	$750 per session	Coed 9–17	Music, robotics, graphics, word processing, business, programming	4 hours per day with computers, 3 hours recreation. Discounts for local public schools. Students work in all labs first week, specialize second week.
UNIVERSITY OF ALABAMA AT BIRMINGHAM COMPUTER CAMP Special Studies, Univ. of Ala. 917 11th Street **South Birmingham, AL 35294** (205) 934-2213	2 3-week sessions, June 10–July 26, day	$295 per session	Coed 11–17	BASIC, literacy, computer history	4 hours per day with computers, 4 hours of instruction. Speakers, tours of local computer facilities.

CAMP	SESSIONS	TUITION	AGE GROUP	CURRICULUM	COMMENTS
WESTERN STATES					
ARIZONA COMPUTER CAMP 2946 Darca Drive **Prescott, AZ 86301** (602) 445-3778	6 1-week sessions grouped by age, July 6–Aug. 3, resident	$295 per session	Coed 8–15	BASIC, Logo, graphics, word processing	Students collect environmental data to be used in programs later. Half day on computer; orienteering, outdoor activities used to balance.
CALI-CAMP COMPUTER CAMP 1717 Old Topanga Canyon Road **Topanga, CA 90290** (213) 455-1305	5 2-week sessions, June 24–Sept. 6, day	$395 per session	Coed 7–14	BASIC, Logo, word processing, games	Half day on computers, the rest on outdoor activities.
COMPUTER CAMP FOR YOUTH 297 Conference Center Brigham Young University **Provo, UT 84602** (801) 378-4903	4 2-wk sessions, June 17–Aug. 16, resident	$595 per session, family rates about $200 per person	Coed 10–17	BASIC, Logo, Pascal, assembler, graphics, robotics, software	4–6 hours per day on computer; other sports on and off university campus; tours of historical sites. One track for programming, another for applications.
COMPUTER DAY CAMP The Pacific Science Center 200 2nd Avenue North **Seattle, WA 98109** (206) 382-4412	7 1-week sessions, beginning and advanced, June 24–Aug. 16, day	$185 for Center members, $195 for nonmembers, $10 more for advanced classes	Coed 10–15	BASIC, Logo, robotics	4.5 hours per day, with an academic bent. Field trips and individualized instruction. Campers work with their own tabletop robot.
COMPUTER TUTOR CAMP 980 Magnolia Avenue **Larkspur, CA 94939** (800) 227-2866 or (415) 461-7533 in CA	1-, 2-week sessions, June 30–Aug. 23, resident and day	$945 2-week res., $495 1-week res., $645 2-week day, $350 1-week day	Coed 10–17	BASIC, Logo, Pascal, assembler, music, graphics, robotics, game design	4–6 hours per day on computer; outside activities. On campus of Stanford University.
DATA BASE CAMP 6454 Valley View Road **Oakland, CA 94611** (415) 339-2844	1-week, 10-day, 2- and 3-week sessions July 14–Aug. 3, resident	$295 1-week, $475 10-day, $625 2-week, $885 3-week	Coed 7–15	BASIC, Logo, Pascal, assembler, sound and graphics, word processing, robotics	Dramatic arts included in noncomputer activities; 3 hours minimum on computer. Emphasis on individualized non-"canned" teaching.
EASTERN OREGON STATE COLLEGE COMPUTER CAMP Eastern Oregon State College Computer Center **La Grande, OR 97850** (503) 963-1582 in Oregon (800) 452-8639	4 1-week sessions sessions grouped by age, July 22–Aug. 16, resident and day	$130 per week, $80 extra for room and board	Coed 10–16	BASIC, Logo, Pascal, graphics, games	Academic side stressed; 6 hours per day on computer. Other activities as instructor decides.
EXPERCAMP (formerly the Original Computer Camp) 559 San Ysidro Road **Santa Barbara, CA 93108** (805) 969-7871 in California (800) 235-6965	2-week sessions, June 23–Aug. 30, resident	$895 per session	Coed 7–15	BASIC, Logo, Pascal, Forth, 6502 assembler, artificial intelligence, game writing, graphics, robotics	3–6 hours per day on computer. Discounts for multiple children from same family.
SILICON VALLEY COMPUTER CAMP CompuSkil Enterprises 1186 Brittan Avenue **San Carlos, CA 94070** (415) 593-4636	1-, 2-, 3-week sessions, June 23–Aug. 23, resident	$475 per week	Coed 8–17	BASIC, Logo, Pascal, assembler, robotics, music, graphics, or individual study	Half-day minimum on computers; speakers from Silicon Valley. Works closely with minority-enrichment group.
UNIVERSITY OF OREGON COMPUTER CAMP 333 Oregon Hall, Univ. of Oregon **Eugene, OR 97403** (503) 686-4231	1 9-day session, Aug. 18–27, resident	$495	Coed 9–15	Logo, robotics, music, art, word processing, business software, graphics	4 hours per day with computers. River rafting, trips to Oregon coast.

vidualized instruction," which means either low teacher/student ratios or lots of workbook time, depending on who's talking. Ask to be sure.

Valerie Abad, director of Data Base Camp, bemoans the rise of "canned" curricula in computer education. "What are they doing for three hours? Do the kids just play with software, or do they get individualized training?" Abad says her camp deliberately chose to limit its sessions to 30 or fewer students, so its teachers wouldn't be tempted to just point students at a workbook.

Workbooks aren't necessarily bad; some children indeed work better on their own with minimal instruction or interference. Here again you must take your own child's needs into account.

As for subjects offered, almost every camp offers the BASIC and Logo languages, and most offer Pascal. Game writing is a common way to capture children's interest while luring them into programming their own games. This year the hot topic is robotics. One camp, the Computer Day Camp at the Pacific Science Center in Seattle, is developing its own tabletop robot and therefore gives all students their own robot for experimentation and play.

Some camps approach computers through specialized one-subject labs. Others make no bones about their emphasis on teaching Jane and Junior to program, believing that children don't really get a crack at serious programming in most school computer-education classes.

Send Your Daughters

The ratio of girls to boys in computer camps is usually only one to three, and most camp directors think that's a shame. "It's extremely important that parents expose their daughters to do this," says Massing. "Women are awfully good programmers. If opportunities are really equal, if women are encouraged, then they'll succeed." Abad says the best time to start girls in computers and math is between the ages of 10 and 12, to get a jump on the math fear that appears between 12 and 14, when girls start worrying about being attractive to boys. Often parents don't encourage it, she says, "because they figure girls don't need it." Your child's life won't be blighted without computers, of course, but if you don't send your daughter to camp because she's not your son, you're doing her a real disservice.

Don't neglect yourself either. Some camps, such as CompuSkil's CompuTrails camp or the Computer Camp for Youth in Utah, offer sessions for families. These types of camps introduce all members of the family to computing, usually the entertainment and bookkeeping facets. If you want to get away on your own without the kids, you might try a Club Med vacation (Club Med offers computer instruction along with its other enticements) or Computer Camps International in Vernon, Connecticut.

If you don't send your daughter to camp because she's not your son, you're doing her a real disservice.

How to Find Out More

Because computer camps were so trendy during the last couple of years, several guides to computer camps were published in 1984. This year the flood

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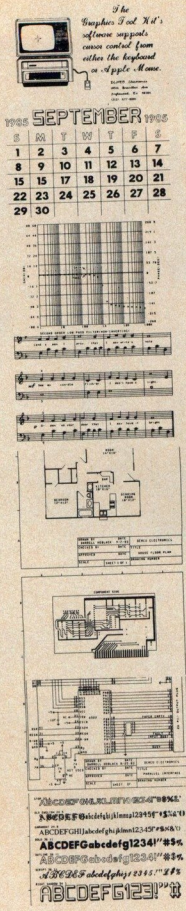

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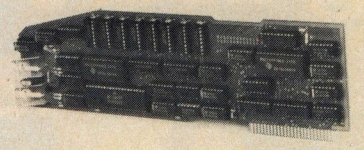

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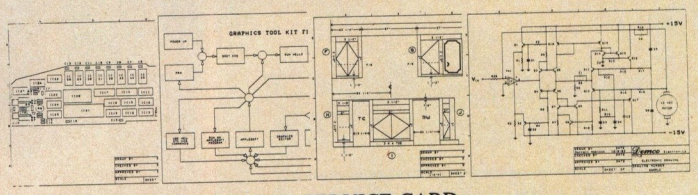

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has subsided, however, and the shakeout in the computer industry has affected computer camps too—not only have many camps folded, but the books on camps are either difficult to find or no longer available.

If you can find a copy, the Alfred Handy Guide *How to Choose a Computer Camp*, by Joseph Cellini, is extremely helpful. *Camps 'n Computers: A Directory of Summer Computer Camp Instruction in the United States*, published by Verbatim Corporation and the American Camping Association, is no longer available, though you may be able to ferret out a copy. Bobbs-Merrill publishes the elusive *The Complete Guide to Computer Camps*, by Mike Benton.

With luck, you'll have the first kid on the block to come home with a robot whittled from twigs and an Indian-beaded diskette.

Some computer camps are accredited by the American Camping Association, which judges camps on the quality of their facilities and their recreational offerings as much as their computer tutoring. The ACA's guide to all its camps (many of which include computers in their curricula even if they're not the emphasis of their program) is available from the ACA for $6.95 at 100-A Bradford Woods, Martinsville, IN 46151.

The A+ Buyer's Guide lists several Apple-specific and generic computer camps as well; this guide is available at your newsstand. Your local computer store may also have a line on good local camps—check nearby universities and colleges, which often offer day camps for locals and residential camps that can also accommodate out-of-towners.

Call Now

Whatever you do, if you're planning to sign up your child for camp *this year*, it's a case of move it or lose it. Some camps may have already filled up, so call as soon as you can. With luck, you'll have the first kid on the block to come home with a robot whittled from twigs and an Indian-beaded diskette. ✚

Vanessa Schnatmeier is a free-lance writer whose chief interests are women's issues and computer marketing.

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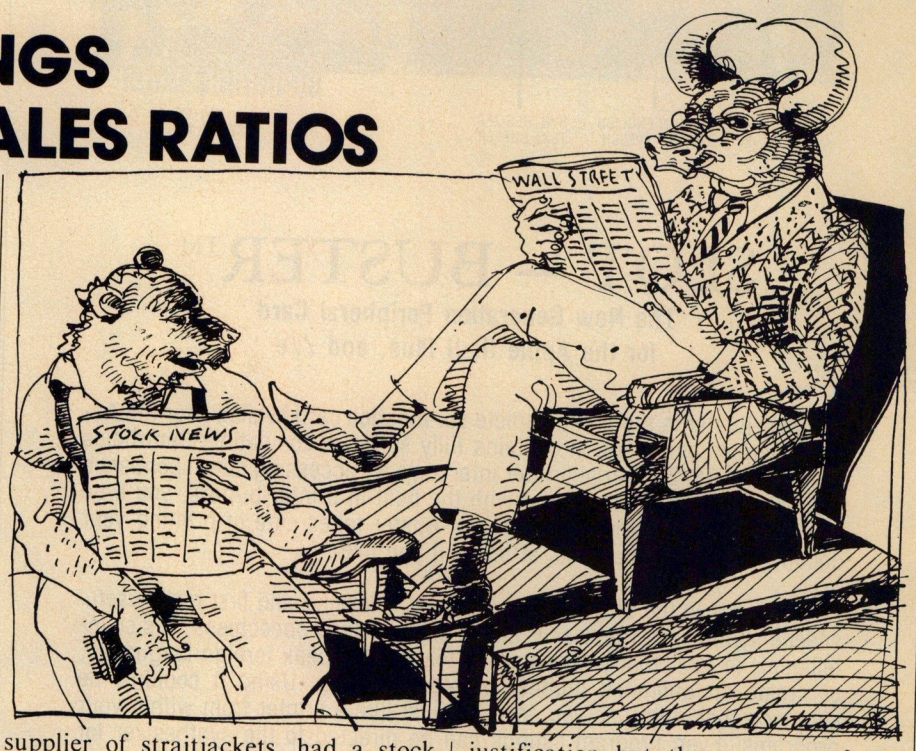
CIRCLE 321 ON READER SERVICE CARD

MONEY MATTERS
BY KEN LANDIS
One part math, two parts common sense, and three parts spreadsheet

PRICE-EARNINGS AND PRICE-SALES RATIOS



Everybody wants to pick a winner and stay away from the losers. Consider the story about the legendary Pat Bolonga. Pat who?

In 1929, at the height of the stock-market craze, Joseph P. Kennedy stopped at a bootblack stand located at 70 Pine Street, an office building near Wall Street. One of the bootblacks was (and still is) Pat Bolonga. Pat and Joe probably talked about a lot of things—baseball and politics perhaps—but the one subject they discussed that later changed both of their lives was the stock market. Joe Kennedy reasoned that if a bootblack was actively playing the market, then things had gone too far and that sooner or later the roof would cave in. Just days before the crash, Kennedy sold his stock. For the price of a shine he had saved millions. Pat lost $8000.

History has shown us that the investment philosophies of both Kennedy and Bolonga were based on the emotion of the moment, rather than on the worthiness of their investments.

Today, 46 years later, a lot has changed, but the object of the markets is still to make money. Everybody has an opinion and a technique for choosing the winners and avoiding the losers. This month, we are going to look at two techniques: one that's been around for many years, the price-earnings ratio, and a brand new technique, the price-sales ratio.

Quite simply, ratios are a quick and easy way to describe a stock in relation to something else—be it another investment, the market, or the stock itself.

Price-Earnings Ratio

To calculate this ratio, divide the market price of the stock by the earnings per share for the last twelve months. For example, if Whackco, a supplier of straitjackets, had a stock price of $10 per share and earnings of $1 per share, its P/E ratio would be 10.

What does a P/E of 10 mean? By itself, nothing, but compared against the P/E of stocks in the same industry, or the market in general, it means a great deal.

Everybody has an opinion and a technique for choosing the winners and avoiding the losers.

Comparing the P/E of stocks in the same industry, or against the market as a whole, quickly shows us which stocks the market favors. The higher the P/E, the higher the market's valuation of the company, and thus its stock. Be careful, though—a high P/E that has no other justification but the romance of the company could signal danger.

On the other hand, a low P/E can indicate a mature industry or company, one in which the prospects for growth are not good.

P/E ratios are typically used to find investments and then to track their relative performance against other stocks in the same industry—and against the market as a whole. Historically, the "average" P/E has been 10, but as the economy—and the industry itself—changes (whoever heard of a steel company that sells gasoline), P/E ratios will probably change, too.

Price/sales (P/S) ratios help you identify stocks you shouldn't invest in. To calculate them, you divide a company's sales during the past twelve months by the number of shares outstanding and then divide the result into the market price of the company's stock.

The resulting P/S ratio gives you an excellent indication of the strength of each dollar of market price.

YVONNE BUCHANAN

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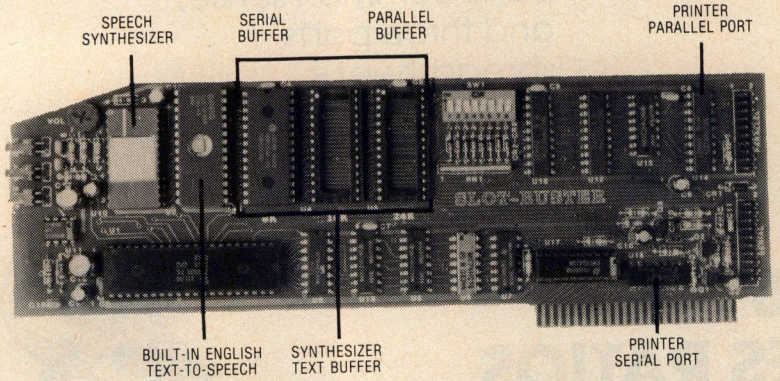

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CIRCLE 118 ON READER SERVICE CARD

Many companies do not have stable earnings, and many high-growth firms have low earnings or none at all. These conditions do not make stock in such companies an unworthy investment, but we do have to measure such companies with a different yardstick than the traditional (P/E) ones. For these companies, the P/S ratio is superior to the P/E ratio for measuring the market's valuation.

In theory, the lower the P/S ratio, the more opportunities there are for price appreciation. The higher the P/S,

Even experts such as Fischer have been mistaken about companies with cancerous debt, but a good P/S, on their balance sheets.

the higher "accounting" the market has taken of the stock.

Remember, use P/E ratios to gauge a stock and P/S ratios to avoid a stock. Good "hurdles" by which to evaluate price/sales ratios come from Kenneth L. Fischer, a widely known proponent of P/S ratios, who is the head of Fischer Investments in Burlingame, California, and author of *Super Stocks*.

Fischer's guidelines for evaluating whether a stock's P/S is too high are as follows: More than 3 is too high for a small growth-oriented or high-tech company, more than .8 is too high for multibillion-dollar concerns, and more than .12 is too high for companies with low margins.

As we learned earlier, the P/S ratio highlights stocks we should avoid. When we find one without a negative P/S indication, however, the next step is to make a thorough, complete, and fundamental financial analysis of the company.

Why? Because a company can have a "good" P/S, but its balance sheet can be a mine field. Even experts such as Fischer have been mistaken about companies with cancerous debt, but a good P/S, on their balance sheets.

Spreadsheet Calculation

With a spreadsheet, P/E and P/S ratio analysis is fast. So fast, in fact, that you will probably want to try it on every investment you consider. Figure 1 is a P/S and P/E ratio worksheet that you can build in about five minutes. Let's take a look at it.

In the inputs section, you enter the

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1685	BANK STREET FILER	69.95	47.35
1405	BANK STREET STORYBOOK	39.95	25.55
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0126	BEAGLE BASIC	34.95	23.30
1192	BEAGLE GRAPHICS	59.95	40.00
0658	BENEATH APPLE DOS	19.95	14.95
1385	BENEATH APPLE PRODOS	19.95	14.95
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1375	BPI GENERAL ACCOUNTING //E	395.00	263.35
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2671	KAMELEON 2C INTERFACE	99.95	65.75
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1144	KING'S QUEST	49.95	33.30
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company name, the last closing price of the company's stock, earnings during the last twelve months, sales, and the number of shares outstanding. You can retrieve this information from the Dow Jones News/Retrieval service, published financial statements, stock-reporting services (e.g., Value Line), or your broker.

Using this information, the spreadsheet then calculates the P/S and P/E ratios from these two simple formulas.

I10:(F2)+C10/(E10/F10)
K10:(F2)+C10/(D10/F10)

To calculate the P/S ratio, first calculate the sales (E10) divided by shares (F10); then divide that figure into the closing price of the company's stock (C10).

P/E is just as easy. The spreadsheet simply divides the closing price of the company's stock (C10) by the earnings per share, which you in turn calculate by dividing the earnings (D10) by the number of shares outstanding (F10). These formulas are replicated for all stocks (rows 11–15) in our example.

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Ken Landis is one of the pioneers in the use of Apples as financial tools.

A/1	B	C	D	E	F	H	I	J	K	L
2	PRICE/SALES AND PRICE/EARNINGS RATIO WORKSHEET									
3										
4										
5	**********					##########				
6				INPUTS					OUTPUTS	
7	**********					##########				
8										
9	COMPANY	PRICE	EARNINGS	SALES	SHARES	PRICE/SALES		PRICE/EARNINGS		
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12	US STEEL	$28.00	($556,000,000)	$18,988,000,000	84,242,424	0.12		- 4.24		
13	GD SEARLE	$57.13	$161,600,000	$1,245,000,000	49,876,543	2.29		17.63		
14	CHRYSLER	$32.50	$981,200,000	$18,000,000,000	133,496,599	0.24		4.42		
15	FORD	$45.63	$2,966,400,000	$51,348,000,000	183,224,212	0.16		2.82		

Figure 1: Price-sales-ratio and price-earnings-ratio worksheet

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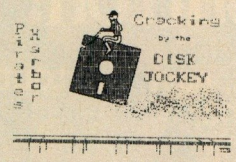

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▶ TUTORIAL/BY GARY B. LITTLE

UNDERSTANDING ProDOS

PART TWO OF A CONTINUING TUTORIAL ON THIS NEW OPERATING SYSTEM PROGRAM FOR THE APPLE II FAMILY. THIS MONTH WE FEATURE A DISCUSSION OF THE MOST COMMONLY USED APPLESOFT DISK COMMANDS, THE ONES THAT ALL APPLE II USERS, NOT JUST PROGRAMMERS, SHOULD LEARN HOW TO HANDLE.

In last month's cover story, Steve Rosenthal and Ken Kashmarek presented an overview of the newest operating system for the Apple II family, ProDOS. In this and three future articles, we'll take a closer look at ProDOS, the Applesoft disk commands and assembly-language subroutines that are used with it, and the underlying software drivers it uses to communicate with input/output (I/O) devices such as disks and clocks. I'll also describe for you how to use two utility programs called Filer and Convert that perform various file-handling chores (such as copying files, formatting disks, exchanging files with DOS 3.3 disks, and so on).

This month, we'll concentrate on the most commonly used Applesoft disk commands, the ones that all Apple II users, not just programmers, should learn how to handle. Before we begin, however, let's review two concepts that you have to understand clearly before you can hope to master ProDOS: directories and pathnames.

A ProDOS disk is called a volume and is identified by a name you assign to it when you first format it. (You can use the ProDOS FILER program for formatting). A newly formatted disk contains one directory, called the volume directory, that holds information concerning a maximum of 51 files. These files can be standard program or data files or files that define other directories (called subdirectories). These subdirectories can also hold either standard files or subdirectory files.

We need to know two things in order to identify any file uniquely on a disk: the name of the file itself and the name of the directory in which it resides. ProDOS receives this information as a unique identifier called a pathname, which comprises the names of each of the directories that ProDOS must traverse to reach the file in question. The first name in the path is always that of the volume directory and must begin with a slash (/). All other names in the path are separated from the previous name by another slash.

For example, I'm writing this article with a copy of AppleWorks on a disk that has a volume directory called A.PLUS. This directory contains a subdirectory file called JUNE that contains a file called PRODOS.PART.II that contains the text of this article. The entire pathname for this file is /A.PLUS/JUNE/PRODOS.PART II.

The rules for naming directories and files are the same. A name must be fewer than 16 characters long and must begin with a letter of the alphabet. The other characters in the name can either be letters, digits, or periods. Note that, unlike in DOS 3.3, filenames cannot contain spaces, special symbols, or control characters.

The Applesoft disk commands used with ProDOS are defined in a file called BASIC.SYSTEM that runs automatically when you boot a disk. (Actually, the first file in the volume directory whose name ends in .SYSTEM is the one that runs. If you are using a disk that contains Applesoft programs, though, BASIC.SYSTEM will undoubtedly be the first such file.) BASIC.SYSTEM extends the Applesoft command set by installing a group of 32 disk commands that any Applesoft program can use. This month, we will be looking at 19 of these commands (see figure 1).

To use an Applesoft disk command from within a program, you must use the Applesoft PRINT statement to print a Control-D character (which signals a coming disk command), the name of the disk command, the command parameters, and then a carriage return. For example, to list all the files in a volume called /UTILITIES, you type (as one line) a program line that looks something like this:

```
100 PRINT CHR$(4);
    "CAT/UTILITIES"
```

In this example, the CHR$(4) statement generates the Control-D character, the disk command is CAT, and the command parameter is /UTILITIES (a pathname). The PRINT statement automatically generates the required carriage return.

If you're entering an Applesoft disk command directly from the keyboard in the Applesoft Command mode (that's the mode where you see the] prompt symbol), you don't have to worry about the Control-D. All you have to do is type the name of the command, followed by the command arguments, and then press Return. The keyboard equivalent of the CAT command is simply

```
CAT/UTILITIES [Return]
```

You should be aware, however, that BASIC.SYSTEM does not permit entry of

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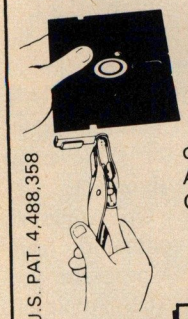

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Command	Syntax
–	pathname (,S#) (,D#)
BLOAD	pathname (,A#) (,B#) (,L# *or* ,E#) (,Ttype) (,S#) (,D#)
BRUN	pathname (,A#) (,B#) (,L# *or* ,E#) (,S#) (,D#)
BSAVE	pathname,A# ,L# *or* ,E# (,B#) (,Ttype) (,S#) (,D#)
CAT	(pathname) (,S#) (,D#)
CATALOG	(pathname) (,S#) (,D#)
CREATE	pathname (,Ttype) (,S#) (,D#)
DELETE	pathname (,S#) (,D#)
EXEC	pathname (,F# *or* ,R#) (,S#) (,D#)
IN#	snum *or* A# *or* snum,A#
LOAD	pathname (,S#) (,D#)
LOCK	pathname (,S#) (,D#)
PR#	snum *or* A# *or* snum ,A#
PREFIX	(pathname) (,S#) (,D#)
RENAME	pathname1, pathname2 (,S#) (,D#)
RUN	pathname (,@#) (,S#) (,D#)
SAVE	pathname (,S#) (,D#)
UNLOCK	pathname (,S#) (,D#)
VERIFY	(pathname) (,S#) (,D#)

Figure 1: The Applesoft disk commands described in this article—Brackets enclose optional parameters.

all its commands from the keyboard this way. You can enter all the examples in this article while you're in the Applesoft command mode, though.

As you can see from figure 1, most of the Applesoft disk commands support, or require, several parameters that specify such information as the pathname of files to be acted on, loading addresses, lengths, and so on. A brief description of each of the parameters appears in figure 2.

You can specify letter parameters in figure 2 (such as ,A#—where # represents the value of the parameter) in any order by appending them to the end of the command line. On the other hand, a pathname or "snum" parameter must come immediately after the command name. (The only exception is the Rename command, which requires two pathnames; the second pathname must appear immediately after the first.)

How to Enter Disk Commands

You can enter most Applesoft disk commands with the slot (,S#) and drive (,D#) parameters that specify the physical location of the disk to be accessed. You don't have to use these parameters if you know the pathname of the file in question, because ProDOS will automatically search all installed disk drives for the file. If you can specify a simple filename, however, to which no prefix has yet been attached (we'll discuss prefixes a little later) or if you use either the ,S# or ,D# parameter, the name of the volume directory specified by the slot and drive parameters (or their defaults) automatically creates the pathname.

This ability to use slot and drive parameters allows Applesoft programs to maintain greater compatibility with DOS 3.3, in which you have to specify the slot and drive parameters to access disks in the nondefault drive.

Let's take a look at some of the more-common Applesoft disk commands.

CAT and CATALOG

Both these commands display a list of the names of the files on a disk. Only the names of the files in the directory specified in the pathname following the command will be in the list. (If no

The ability to use slot and drive parameters allows Applesoft programs to maintain greater compatibility with DOS 3.3.

such pathname is specified, then the list will be of the currently active directory.) CAT also displays the type of each file as a three-character mnemonic such as BAS (BASIC program), BIN (binary file), TXT (textfile), SYS (system program), DIR (directory file), and so on; the number of disk blocks the file occupies (each block is 512 bytes in size); and the date on which the file was last modified.

The CATALOG command displays the same information that CAT does, as well as the time of last modification of a file, its creation date and time, its size (in bytes), and its "subtype" entry. The subtype entry is the default load-

ing address for a BIN file and the record length for a TXT file.

After you've listed all the files in the directory with either the CAT or the CATALOG command, the number of blocks free and blocks used on the disk are displayed. CATALOG also displays the size of the disk, in blocks.

PREFIX

This command lets you define the chain of directory names to which any specified filename will automatically be appended to create the full pathname that ProDOS requires. Setting the prefix to a particular directory path allows you to specify files in that directory by filename only, instead of by full pathname.

You can add to an existing prefix by specifying the name of the next-lower-level subdirectory.

Suppose the volume-directory name of a disk is/GEOGRAPHY and that it contains a subdirectory file called EUROPE (its file-type mnemonic would be DIR). If you want to access a file in the EUROPE subdirectory by just specifying a simple filename and not the entire /GEOGRAPHY/EUROPE/FILENAME pathname, enter the command PREFIX/GEOGRAPHY/EUROPE to set GEOGRAPHY/EUROPE as the prefix.

You can add to an existing prefix by specifying the name of the next-lower-level subdirectory (without a preceding slash). For example, if /GEOGRAPHY/EUROPE contains a subdirectory called FRANCE, you can set the prefix to /GEOGRAPHY/EUROPE/FRANCE by entering PREFIX FRANCE (assuming, of course, that the preexisting prefix is still /GEOGRAPHY/EUROPE).

If you want to know the current setting of the prefix, simply enter the PREFIX command without any parameters, and the prefix will appear. (Note: If you do this inside an Applesoft program, the prefix string will be set equal to the string variable in the next INPUT statement. That is, after

```
100 PRINT CHR$ (4): "PREFIX":
    INPUT A$
```

is executed, A$ will contain the prefix.)

Whenever you remove a disk from a drive and insert another one, you should set the prefix to the volume-directory name of the new disk. The easiest method is to enter a command such as PREFIX,S6,D1 (for a slot-6, drive-1 disk). If you don't take this step, you will see a PATH NOT FOUND error message if you use CAT or CATALOG on the new disk without specifying its volume-directory name.

CREATE

You use this command to create a directory entry for a specified file. Its most common use is to create subdirectory files, since the other common types of ProDOS files (Applesoft programs, binary files, and text files) are automatically created by other Applesoft disk commands (SAVE, BSAVE, and OPEN).

For example, if you want to create a subdirectory that is called DEMO.PROGRAMS within the current di-

Parameter	Standard Meaning	Permitted Values
pathname	the active file	(see text)
snum	active I/O slot	0–7
,A#	starting address	$0000–$FFFF
,B#	byte number	$0000–$FFFF
,D#	disk-drive number	1–2
,E#	ending address	$0000–$FFFF
,F#	field number	$0000–$FFFF
,L#	length	$0000–$FFFF
,@#	line number	$0000–$FFFF
,R#	record number	$0000–$FFFF
,S#	disk-slot number	1–7
,T#	file-type code	$00–$FF(*)

(*) You can specify a three-character file type mnemonic with the ,T# parameter instead of a number (see text). For this reason, this parameter is usually referred to as the ,Ttype parameter, where type = BAS, BIN, TXT, SYS, DIR, and so on.

Figure 2: The Applesoft disk-command parameters—the # in the parameter name represents the parameter's value. The value can be specified in hexadecimal or decimal format (hexadecimal numbers must be preceded by $).

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CIRCLE 349 ON READER SERVICE CARD

rectory, you enter the command CREATE DEMO.PROGRAMS at the keyboard. As a result, a subdirectory file (marked by a DIR mnemonic) appears in the current directory. You can also create other types of fields by using the ,Ttype parameter (where *type* is the three-character mnemonic for the file type).

LOAD, SAVE, and RUN

These three commands act only on Applesoft program files (the CATALOG mnemonic for such files is BAS). The LOAD command moves such programs from disk to memory, where you can list, edit, or run them. The SAVE command achieves the opposite result. This command transfers the Applesoft program in memory to a disk file. The RUN command is the same as the LOAD command, except that after you load the program, it runs automatically.

The ProDOS version of the RUN command is different from the DOS 3.3 version in one respect. You can use ,@# to specify the line number in the Applesoft program that is to run first (if you don't specify otherwise, the program always starts running at the lowest line number). For example, the command

```
RUN/GAMES/MOUSE.TRAP,@500
```

would run a program called MOUSE.TRAP (in the GAMES directory), beginning at line 500.

BLOAD

This command lets you transfer data from a file to an area of memory. The most common form of the BLOAD command is

```
BLOAD MY.FILE,A#
```

where # represents the address of the beginning of the block to which the file is to be transferred.

The default file type is binary (BIN), but you can override the default by using the ,Ttype parameter. You can also use the BLOAD command without the ,A# parameter; in this case, the file will be loaded at the location at which you originally saved it to disk with the BSAVE command (this address appears in the Subtype column when you catalog the disk with the CATALOG command).

The easiest way to create an EXEC file is to use a word processor or line editor that stores its documents as standard ProDOS text files.

You can load any portion of a file by using one or more optional parameters: ,B# (the starting position within the file), ,L# (the number of bytes to be transferred), and/or ,E# (the last memory location of the transfer).

BRUN

This command is the same as the BLOAD command, except that after you load the file, it runs automatically, beginning at the loading address. You can use the BRUN command only with binary (BIN) files.

BSAVE

BSAVE allows you to save the contents of a range of memory to a file. (The default file type is binary [BIN], but you can override this default with the ,Ttype parameter.) For example, in order to save the contents of memory locations $300–$3CF to a binary

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CIRCLE 306 ON READER SERVICE CARD

file called PAGE.THREE, you enter the command

```
BSAVE PAGE.THREE,A$300,E$3CF
```

or

```
BSAVE PAGE.THREE,A$300,LSD0
```

where ,A$300 indicates the starting address of the range, ,E$3CF gives the ending address, and ,L$D0 shows the number of bytes to be saved. You can also use ,B# to specify the byte position in the file at which the writing will begin. Note that the DOS 3.3 version of BSAVE did not have the ,E# or the ,B# parameters.

The LOAD command moves Applesoft program files from disk to memory, where you can list, edit, or run them. The SAVE command achieves the opposite result.

EXEC

This command redirects requests for input, which normally comes from the keyboard, to a specified text file instead, until the computer has read everything in the text file. Suppose you have a text file called MY.STARTUP, for example, that contains the following three lines:

```
HOME
PREFIX,S6,D1
RUN MY.PROGRAM
```

Enter EXEC MY.STARTUP from the Applesoft Command mode, and the screen will clear; the prefix will be set equal to the name of the volume directory on the slot-6, drive-1 disk; and the MY.PROGRAM program (in the volume directory) will be loaded and executed, just as if you had entered all three commands directly from the keyboard. If you don't want to use EXEC on an entire file, you can use ,F# or ,R# to specify the number of the first line in the file to be used.

The easiest way to create an EXEC file is to use a word processor or line editor that stores its documents as standard ProDOS text files. For example, you can use the AppleWorks word processor to compose a file and then save it to disk by pressing open-Apple P and indicating that you want to print the file to a text (ASCII) file on disk.

– (Dash)

This "intelligent run" command has no DOS 3.3 equivalent. Its pathname can describe an Applesoft program, a binary program, or a text file, in which cases – will behave exactly like a RUN, BRUN, or EXEC command, respectively. You can also use the dash to load and run ProDOS system programs such as BASIC.SYSTEM. (System programs' CATALOG mnemonic is SYS.).

LOCK and UNLOCK

These two commands let you modify the write-protect status of a file. Once you've locked a file with the LOCK command, you cannot delete, modify, or rename it unless you unlock it first with the UNLOCK command. You can easily identify the status of a file by using CAT or CATALOG to display the names of the files on the disk. If an asterisk precedes the name of the file, it is locked.

DELETE

You use this command to remove the entry for a file from the disk directory and to free up the disk blocks that

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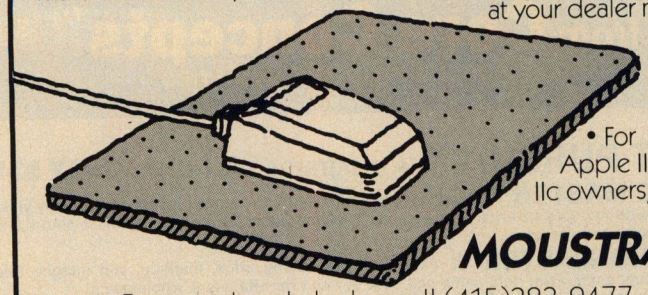

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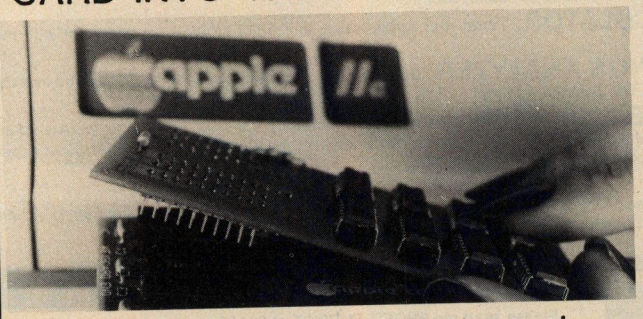

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the file is using. The DELETE command works only on unlocked files.

RENAME

This command lets you change the name of any file on a disk from the first specified filename to the second. For example, if the current name of the file is SUPERMAN and you want to change it to SUPERWOMAN, you enter the command RENAME SUPERMAN,SUPERWOMAN to effect the change.

IN# and PR#

These commands redirect requests for input (IN#) or output (PR#) to a peripheral card in an expansion slot (the slot number is specified by the snum parameter) or to the address of any input/output (I/O) subroutine in memory. For example, to redirect output to a printer in slot 1, use the command PR#1, and to accept input from a subroutine located at hexadecimal $300, use the IN#A$300 command.

Another form of the IN# and PR# commands can enable you to redefine the meaning of an IN# or PR# command that is used with a slot-number parameter. If you enter the command PR#1,A$300 or something similar, then whenever you subsequently enter a PR#1 command, output goes to location hexadecimal $300 instead of to slot 1.

VERIFY

The VERIFY command really has only one useful purpose—to determine whether a particular file or directory exists on a disk. (In DOS 3.3 you use it to check whether any part of the file has been lost because of damage to the disk.) For example, if the current prefix is /A.PLUS and you want to see if the pathname /A.PLUS/PART.TWO exists, enter a VERIFY PART.TWO command. If the pathname does, indeed, exist, no error message will appear. If it doesn't, you will see a PATH NOT FOUND error message.

Well, that ends this month's discourse on the first group of Applesoft disk commands. Next month we'll continue by introducing you to the remaining disk commands, those that are most useful for programmers. ✚

Gary B. Little is a lawyer and author residing in Vancouver, British Columbia. He has written three books for programmers of the Apple II series of computers: Inside the Apple IIe, Inside the Apple IIc, *and* Apple ProDOS, Advanced Features for Programmers *(1985, Brady Communications).*

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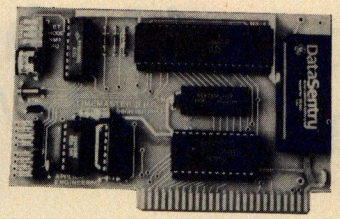

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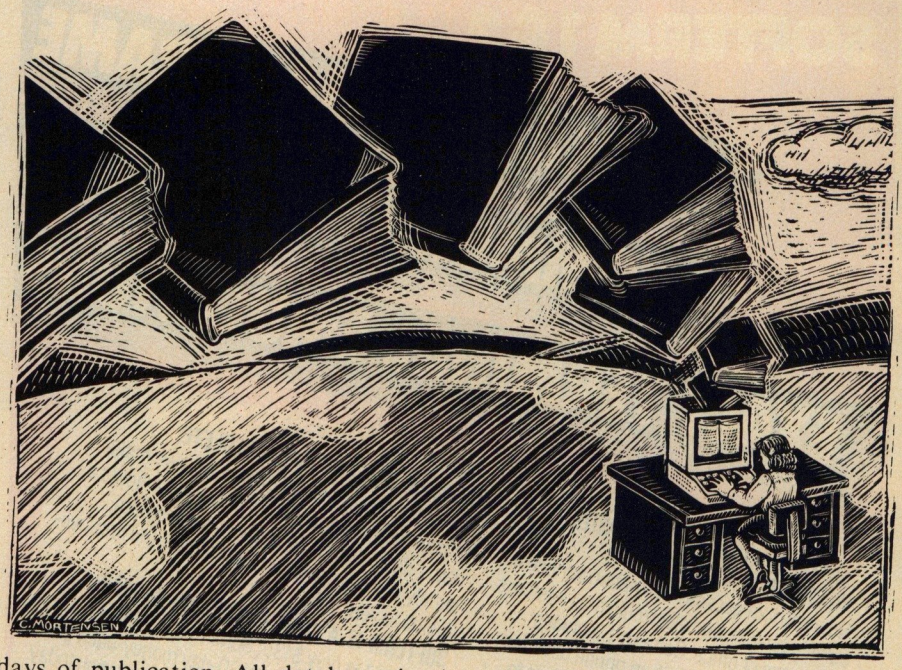
DATABASES AND DIALOGUES

Telecommunications represents a growing industry. Modem prices are down, modem sales are up, and new services are being introduced every year. Corporations, schools, and individuals are discovering the convenience of telecommunications.

This month, we look at two new services—Wilsonline, a collection of databases used worldwide by libraries, corporations, and government agencies; and American People Link, an electronic-mail and entertainment service for the home. We also include telecommunications news of interest and then end with a letter from a reader who properly chastises me and proposes a worthwhile project.



CRISTINE MORTENSEN

WILSONLINE

Many venerable publishing companies are offering electronic editions of their printed work. The latest entry is Wilsonline from the H.W. Wilson Company, a firm that traces its reference roots back to 1898. You may not recognize the company name, but anyone who has researched a term paper knows all about its primary product, *The Reader's Guide to Periodical Literature.*

Wilsonline consists of 14 databases, 10 of which are on-line versions of Wilson's printed indexes—Applied Science and Technology Index, Biological and Agricultural Index, Book Review Digest, Business Periodicals Index, Cumulative Book Index, Education Index, Humanities Index, Index to Legal Periodicals, Reader's Guide to Periodical Literature, and Social Sciences Index. Four other databases—Library of Congress/MARC File, Journal Directory, Publisher's Directory, and Name Authority file—are available only on-line.

Wilsonline updates the databases twice per week, with citations to articles appearing on-line generally within ten days of publication. All databases include at least one and a half years of citations, and most go back even further. The Library of Congress/MARC file stretches back seven years.

Wilsonline plans to add more databases during 1985, including Art Index (October), Bibliographic Index (November), Biography (July), General Science Index (May), and Library Literature (October). Currently, Wilsonline houses information on more than 3000 periodicals and 500,000 books.

Modem prices are down, modem sales are up, and new services are being introduced every year.

How to Use Wilsonline

You can search the databases individually or search up to eight databases at the same time. For veteran researchers, the commands are fairly standard. For newcomers, the commands prove easy to master. Wilsonline comes with a 105-page tutorial book to help you get started. An extensive manual, *Wilsonline Guide and Documentation*, which describes search procedures and databases in detail, costs an extra $30.

Wilsonline uses the free-text and controlled-vocabulary methods for searching databases. Free text means that you can find citations by entering any string of characters. The system checks your characters against those on file and provides all the matches.

Controlled vocabulary means you enter specific terms defined by the company. The system returns all citations logged under those terms. For example, to locate information on Winchester hard-disk drives, you can enter Winchester, using free-text searching, or Memory Devices (Computers), using controlled-vocabulary searching.

Wilson extends the flexibility of its searching methods by including the

Boolean operators AND, OR, and NOT; the ability to truncate free-text search words; and scanning through a particular date range. These features allow you to narrow your search—saving time, effort, and money.

The citations provide a variety of information, the most important being where to look for information on a particular topic. Do not get me wrong, the printed versions are extremely helpful, but one search using Wilsonline may just convert you to telecommunications for life.

Price

H.W. Wilson Company maintains a fairly involved pricing schedule, with discounts for prepaid Wilsonline subscriptions and for subscribers of the printed indexes. Nonsubscribers to Wilsonline or the printed indexes pay $45–$65 per connect hour (depending on database), plus $8 per hour for telecommunications charges (access via Tymnet or Telenet). Off-line prints cost 20 cents per citation with a $10 minimum. A one-day training seminar is $60 per person.

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This expanded version of Softerm lets you access the information stored in your company's mainframe. With either version of Softerm, you can download information into your Apple and capture it on your own disk in any format you choose—DOS, CPM,™ or Pascal. Softerm's extensive file transfer capabilities provide automatic execution using command files, support for popular protocols like XMODEM, and our own Softrans™ protocol which comes with an adaptable program for your host computer.

MAKES YOUR APPLE WORK EXACTLY LIKE ANY MAJOR TERMINAL.
Softerm 2 includes exact emulations of more than 25 popular terminals, and provides all keyboard and display functions. Also, both conversational and block modes are supported.

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Hewlett Packard 2622A
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Softerm is also available in versions for the IBM PC and Tandy Model 1000 and 2000 personal computers.

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AMERICAN PEOPLE LINK

American People Link aspires to become another full-featured home service like CompuServe, The Source, and Delphi. Obviously, it faces an uphill battle against these firmly entrenched services. Still, the telecommunications industry is so dynamic that a newcomer can carve out its own niche and grow if it offers the right mix of features, responsiveness, and price.

With these criteria in mind, I can easily get excited about American People Link. Although currently a bit short on features, it lets you know right from the start that it wants subscribers' input. One phrase in the manual caught my eye: "You are a valued customer and we will always treat you as such." If the company follows through with that resolution, we predict a long and happy life for American People Link.

Promises aside, American People Link currently offers two main services: electronic mail and Partyline. Electronic mail allows you to trade messages with other subscribers. Partyline, like CB Simulator on CompuServe or Chat on The Source, lets you talk live to other subscribers.

American People Link aspires to become another full-featured home service.

With Partyline, you can hold a private conversation with select people by using a code word. Also, you can use a Muffle and Hush command so that an obnoxious partner can neither see your typed lines nor send you typed lines. This handy feature certainly cleans up the party.

The service is easy to use and offers a choice of menus and commands. Newcomers should become fluent with the commands within a short time. Every command is preceded with a slash (/), such as /HELP, /HUSH, or /OFF, and you can toggle the menu back on, should you forget a particular command.

American People Link offers an on-line newspaper with features, advice column, editorial, and letters to the editor; a subscriber directory so you can find other people with similar interests; and a printed newsletter called Letterlink. New features in the works include a bulletin-board service, special-interest clubs, on-line interviews with celebrities, and simple two-player games

Tally outwrites Imagewriter. With better performance at a better price.

Our new MT 85 and MT 86 write 50% faster than Apple's Imagewriter. We give you the same typestyles you get with MacWrite.™ The same graphic flexibility you have on a Macintosh.™ But there's one standard feature on the Tally MT 85 and MT 86 that doesn't even come on an Imagewriter.

Ultra-fine correspondence quality.

Which lets you produce letter perfect work at 45 characters per second on your Apple IIe or IIc.

And it all fits in a space not much bigger than your in-basket.

Introducing Apple®-compatible printers from Mannesmann Tally starting under $500.

Draw your own conclusions.

MANNESMANN TALLY MT 85/86	APPLE IMAGEWRITER
SPEED	
180 cps	120 cps
CORRESPONDENCE QUALITY	
Standard	Not Available
MULTI-TYPESTYLE CARTRIDGES	
Yes	No
MODULAR INTERFACE	
Yes	No

See your Mannesmann Tally dealer for a demonstration of the most exciting new printers you can have for the money.

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CIRCLE 181 ON READER SERVICE CARD

that use the graphics capabilities of your Apple.

Price

And what is the cost for this service? A one-time initial subscription fee of $14.95, and just $2.95 per hour on weekends and from 6:01 P.M. to 7 A.M. weekdays, for 300 baud. That is roughly half the price of CompuServe and Delphi and less than half the price of The Source. This price increases to $8.95 for 1200 baud. Prime-time service from 7:01 A.M. to 6 P.M. weekdays, for both 300 baud and 1200 baud, costs $8.95; again, about half the cost. Access is via Telenet, and Canadian subscribers who use the Datapac system pay a $5-per-hour surcharge.

TELETIPS

This section provides news related to the telecommunications world and offers a quick overview of new features added to services already reviewed. The information comes from culling the numerous press releases that streak across my desk each day.

Nuke 'Em 'Til They Glow

No joke, folks, Flying Buffalo, Inc., held the first "The Day Before" National Nuclear War Card Game Tournament on April 14–15, 1984, using electronic mail on CompuServe and MCI Mail. As you might expect, "there were no winners (everyone was destroyed). The destruction of the world took only 23 hours . . . 1485 megatons of nuclear warheads were dropped on targets, and 687 million people died." Toledo, Ohio, was the last city vaporized, and it won the coveted "Supergerm" traveling trophy. The second annual tournament was held on April 13–14, 1985. We'll tell you the results as soon as we get them.

▶ The destruction of the world took only 23 hours . . . .

Flying Buffalo, long a play-by-mail game company, also runs other war games using CompuServe electronic mail, including Galactic Conflict, Heroic Fantasy, Feudal Lords, and Starweb. For more information, contact Flying Buffalo at its mail I.D., PPN 76703,703 or type GO GAM-41.

AEC to the Rescue

The Association of Electronic Cottagers offers marketing support, business and professional services, on-line consultations, and databases for "computer entrepreneurs and telecommuters who work at home on salary." Founders Paul and Sarah Edwards, who operate the Work-At-Home Special Interest Group on CompuServe, have drafted an Electronic Cottage Bill of Rights with eight provisions.

Provision 1, for example, states: "Legislatures shall make no laws prohibiting freedom of opportunity to work in one's home with a computing and/or robotic device when that work does not interfere with neighbors' enjoyment of their own homes and communities." For immediate information, contact CompuServe PPN 76703,242.

CompuServe Additions

Sports enthusiasts can now access TeleSports, a sports-information service featuring news about collegiate and professional athletics, including point spreads, injuries, statistics, team analysis, and scores.

CompuServe now distributes USA Today Update, Gannett's electronic information service, which provides general news, business news, weather, international news, and special reports on specific industries and professions.

The Source Updates

The Source adds up-to-the-hour commodities prices, news, and commentary with Commodity World News. The new service offers hourly price updates for 57 commodities, approximately 200 news items per day, and general industry insight updated three times per day.

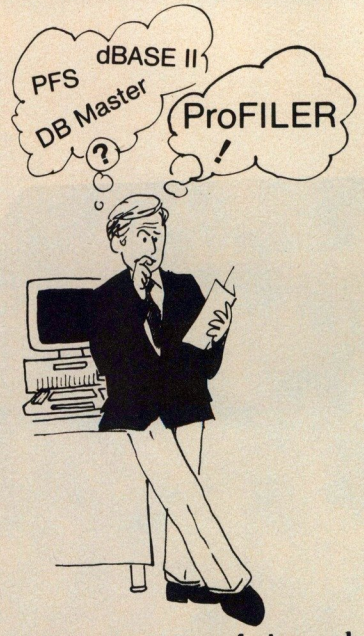
The Source also offers A–Z, a comprehensive database, listing information about 14,000 domestic and 8000 international hotels. A–Z is updated monthly.

Properly Chastised

From Mike Jayson of Jason Electric: "I enjoy your column very much! I wish it was a monthly feature of *A+*; especially with the increasing numbers of folks who telecompute. However, I am SHOCKED that you tell people to WRITE you. What, no E-mail number for CompuServe or The Source! You of all people."

May I disconnect my modem for a month! My apologies to Mike and to those who actively use telecommunications. I admit I look at CompuServe E-mail rarely, preferring to bounce around the Creative Computing SIG (PCS-22). I urge you all to check into the CC SIG (the monitor torture test in DL7, written in Applesoft BASIC, has attracted quite a bit of attention). For those who want to send E-mail to me directly, my PPN is 70210,750. I promise to check my box more often. Of

Confused About Data Base Programs?



When you compare feature and price there is no confusion.

ProFILER 2.0 is HERE!

The Data Manager for the Apple Computer with all the NEW features you've been waiting for.

8 times faster than DOS 3.3 – Twice as fast as ProFILER 1.0

FEATURE	ProFILER†	PFS File*
Multiple Forms per Disk	YES	NO
Maximum Records per File	1500+	1000
(65,000 w/ ProFILE Hard Disk)	YES	NO
Report Generator Included	YES FREE	NO ($100)
Pro DOS Operating System	YES FREE	NO
Full Screen Editor	YES	NO
Works on Apple II+, IIe, IIc, III, Franklin	YES	YES
Arrow Keys function OK	YES	NO
Multiple Index Files	YES	NO
Auto Catalog of Data Files - NEW	YES	NO
Variable Printer Initialization - NEW	YES	NO
Reports to Screen or Printer - NEW		
Easy Word Processor Interface - NEW	YES	NO
Apple writer II® Mailmerge Interfaces - NEW	YES	NO
Cost DataBase	$89.95	$90.00+
Report Generator	FREE	$90.00+
TOTAL COST	$89.95	$180.00+

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Whether you're looking for sunken treasure, or graphing your business sales, you must have effective graphics tools. And when it's time to print your results, you need to get what's on your screen off your screen. Enter the Grappler printer interface. Quick, easy and effective.

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We all know that a picture tells a thousand words, so your graphics are your most important printouts. With the Grappler, graphics printing is a snap. A few quick and easy keystrokes, and your Hi-Res image is promptly reproduced on just about any printer you care to name. Depending on which keys you hit, your graphics can be printed enlarged, enhanced, inverted, rotated, and... well, the message here is flexibility.

A GRAPPLER DESIGNED FOR YOU

To date Orange Micro has sold over 255,000 Grapplers, so you know you're in experienced hands. There are Grapplers available for many popular micros, including parallel and serial models for the Apple IIe, a new version for the Apple IIc and an advanced Commodore 64 interface. Most Grapplers offer buffering or other valuable options. All come with the "Seldom Used 1 Year Warranty." There's a Grappler for virtually every application, so remember to ask for it by name when you purchase your printer interface. You'll be glad you did. Graphics printing has never been so easy.

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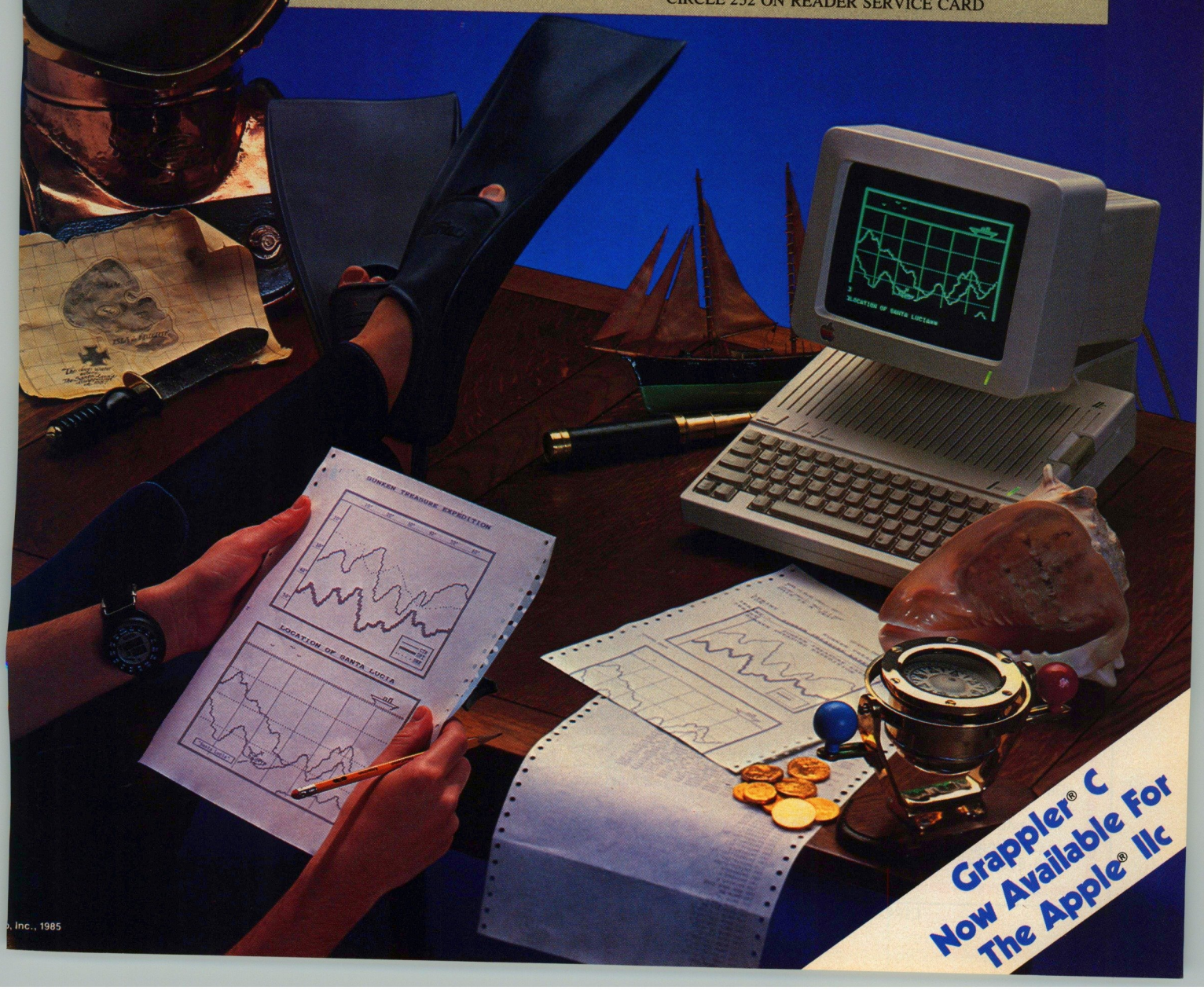

, Inc., 1985

Replace 19 floppies with 1 diskette?

TeamMate does it!

Now your Apple IIe can have high capacity data storage like a Winchester while you still enjoy the convenience and familiarity of a standard floppy.

TeamMate's flexible disk drive from **Eastman Kodak** gives you 2.78 megabytes of data storage on one rugged diskette. You get unlimited expandable storage and access to Winchester capabilities...**at a very low cost.**

Installation takes only minutes, thanks to TeamMate's software transparency with ProDOS. No software drivers or modifications are needed.

Here are the TeamMate subsystems available now:

TM 2203...A single Kodak flexible disk drive giving you 2.78MB on one diskette.
TM 2206...Two Kodak drives for a total of 5.56MB of online, expandable storage.
TM 2210...10MB of Winchester storage, with the option of later adding a Kodak flexible drive.
TM 2213...A 10MB Winchester combined with the Kodak 2.78MB flexible drive for built-in backup.
TM 2232...32MB of Winchester storage—the ultimate in high performance mass storage.

TeamMate Model	Quantity 1-2	Quantity 3-9	Quantity 10+
TM 2203	$ 895	$ 761	$ 716
TM 2206	$1295	$1101	$1036
TM 2210	$1295	$1101	$1036
TM 2213	$1695	$1441	$1356
TM 2232	$2195	$1866	$1756
Kodak Diskettes	$ 15	$ 14	$ 12

All TeamMate subsystems include drive(s), controller, TeamMate chassis, power supply, necessary cabling, and manual. Kodak subsystems include a Kodak diskette.

Team• Mate

Yes, I want to expand data storage on my Apple IIe. Please send me the following:

Price includes UPS surface shipping.
Allow 3-4 weeks delivery.

Quantity:
_____ TeamMate 2203 @ _____ ea.
_____ TeamMate 2206 @ _____ ea.
_____ TeamMate 2210 @ _____ ea.
_____ TeamMate 2213 @ _____ ea.
_____ TeamMate 2232 @ _____ ea.
_____ Kodak diskettes @ _____ ea.

Subtotal _____
CA & MA residents, add sales tax _____
For optional UPS Blue Label delivery add $10 per unit _____
Total Enclosed $ _____

Ship To:
Name _____
Address _____
City _____
State _____ Zip _____
Daytime Phone _____

Payment Enclosed:
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Make check payable to:
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Dept. TM-1A
2525 Walsh Avenue
Santa Clara, CA 95051

For fastest delivery, call:
In California, call collect:
408-986-9545

1-800-824-3724

CIRCLE 250 ON READER SERVICE CARD

course, for those who do not yet own a modem and CompuServe account, you can rely on the post office.

With the telecommunications gap crossed, Mike also has a project suggestion: to see a listing of bulletin-board services for Apple users. Well, bulletin boards have a funny way of appearing and disappearing quickly. Nevertheless, they are popular; and I think your suggestion is a good one. So, bulletin-board sysops, send me a letter, by E-mail or on regular paper, telling me about your bulletin board. Space providing, and if I can verify that the BBS is operating, I will see about printing a listing.

Logging Off

Telecommunications is a growing industry for business and for the home. Whether for research or leisure, connecting a modem to your Apple places a window to the world at your fingertips. ✚

Russ Lockwood is an assistant editor at Creative Computing *and a former staff writer for The New York Times Information Service.*

▶ FURTHER INFORMATION

Wilsonline
950 University Avenue
Bronx, NY 10452
(212) 588-8400
CIRCLE 368 ON READER SERVICE CARD

American People Link
3215 North Frontage Road
Suite 1505
Arlington Heights, IL 60004
(312) 870-4260
CIRCLE 369 ON READER SERVICE CARD

Flying Buffalo
P.O. Box 1467
Scottsdale, AZ 85252
(602) 966-4727
CIRCLE 370 ON READER SERVICE CARD

AEC
677 Canyon Crest Drive
Sierra Madre, CA 91024
(818) 355-0800
CIRCLE 371 ON READER SERVICE CARD

CompuServe
5000 Arlington Centre Blvd.
Columbus, OH 43220
(614) 457-8600
CIRCLE 372 ON READER SERVICE CARD

The Source
1616 Anderson Road
McLean, VA 22102
(703) 734-7500
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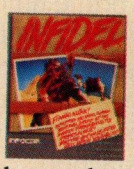
To look at Infocom stories, you'd say they're all prose. No graphics. Ah, but there's more than meets your eyes.

We draw our graphics from the limitless imagery of your imagination—a technology so powerful, it makes computer screen pictures look like graffiti by comparison.



And no one knows how to unleash your imagination like Infocom. With thrilling plots. Unpredictable situations. And original puzzles calculated to drive you out of your skull.

Step up to Infocom. All words. No graffiti. The secret reaches of your imagination are beckoning.

It's time to open your mind's eye.

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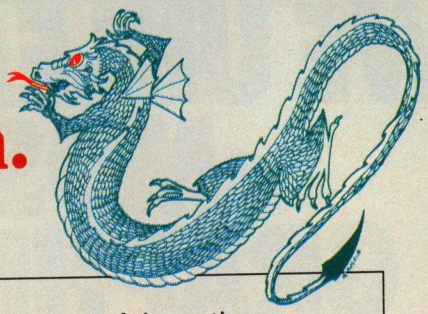
Big Game Hunting? Try Baggin' Our Dragon.



It's the biggest game in town

Our dragon, of course, is Wizardry—that unique series of computer recreation programs designed for Apple users who are seeking the ultimate "big game" challenge.

Since its debut, Wizardry has been the best-selling computer game of its kind.

For a very good reason:

Because Wizardry is more than just a game, more than a diabolically clever maze.

Wizardry is a complex world of variety and depth. A world of richness and pleasure.

Packed with suspense, full of surprises, Wizardry is enchanting—a compelling diversion that turns your leisure time into prime time.

Wizardry is powerful and sophisticated. A simple command system, 3D maze displays and superb programming provide you with month after month of involvement and satisfaction.

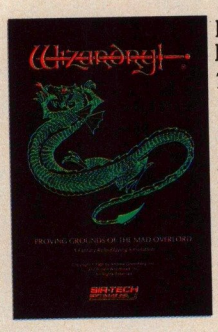
Four years old and still growing, the game is already recognized by critics and game lovers as a classic.

Simply stated, Wizardry is the finest fantasy role-playing computer game you can buy.

Set your sights on the best. Track down Wizardry—the biggest game in town.

Enter the World of Wizardry®

A Classic Encounter

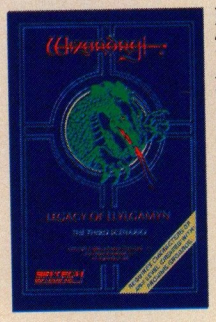


Proving Grounds of the Mad Overlord

The First Scenario

Unlike any other game you have ever played. A fascinating 10-level maze full of monsters, sorcery, traps and treasures. As you gain skills, the characters you create grow stronger, richer, wiser and better able to survive. The final goal is elusive. Your experience . . . unforgettable.

Twice voted "All Time Most Popular Computer Program" —Softalk Readers

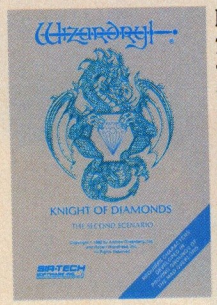


Legacy of Llylgamyn

The Third Scenario

A spellbinder that advances the classic traditions of Wizardry. Find the great dragon L'kbreth and save the people of Llylgamyn. Includes full screen maze display and Windo-Wizardry, the revolutionary pop-up window graphics system. Requires brave adventurers of any level developed in PROVING GROUNDS.

". . . A Landmark in Graphics Advancement" and "The Best Yet" —Softalk

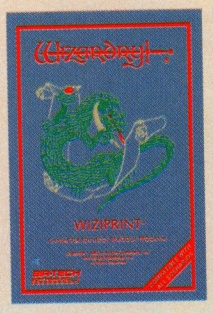


Knight of Diamonds

The Second Scenario

This classic journey should only be attempted with those Wizardry heroes who have attained the 13th level of ability in PROVING GROUNDS. Their challenge—and yours—to adventure through a six-level maze and become the Knight of Diamonds. First-rate fantasy!

Awarded "Best Adventure Game for the Home Computer"
—Game Mfrs. Association of America



Wiziprint

Character Statistics Printout

A helpful utility program that prints the possessions, attributes and known spells of all your Wizardry characters. Quick, neat and easy-to-read. For use with 80-column printers. Compatible with all Wizardry scenarios. A real timesaver!

"Wiziprint is a very handy utility disk for ardent Wizardry players"
—Roe R. Adams III, Softalk

LOOK FOR THE DRAGON—
SYMBOL OF WIZARDRY.
PROMISE OF EXCELLENCE.

All software available for Apple II series computer 48k
Coming soon for the Macintosh
Proving Grounds also available for IBM PC and PCjr 64k

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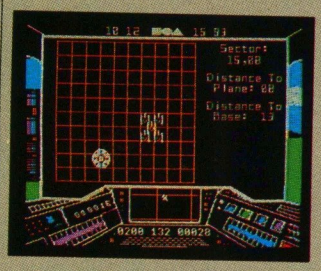
SKYFOX
ARCHON
STAR LEAGUE BASEBALL
RESCUE RAIDERS
MR. ROBOT AND HIS ROBOT FACTORY

THAT'S entertainment



You're looking out the front windshield of a supersonic fighter, and instead of aliens, you see planes, tanks, and a monstrous mothership.

SOPHISTICATED SHOOT-'EM-UP

You think you have it rough? Why, back in the olden days—long before double-hi-res graphics, flight simulators, and two-button joysticks—all we had to play was Space Invaders, and it was in black and white!

In Space Invaders, these rows of aliens came down from the top of the screen, and you had to hide behind bunkers and fire at them. It wasn't much, but it sure ate up a lot of quarters and a lot of afternoons.

Since that time, all sorts of clever games have appeared in the arcades and are available for home computers, as well—games with great graphics and animation that require real strategy to win. The funny thing is, a lot of them are shoot-'em-ups, more variations on the Space Invaders idea.

A Case in Point

Skyfox, by Electronic Arts, is a clever adventure in which you participate from the perspective of the pilot. You're looking out the front windshield of a supersonic fighter, and instead of aliens, you see planes, tanks, and a monstrous mothership. Your job is to keep them from destroying your home base. The only way you can protect your home base is to shoot them down or blow them up. Not a lot of room for skilled diplomacy here, right?

To the credit of its designer, Ray Tobey, however, Skyfox is a very sophisticated shoot-'em-up. A computer shows you the enemy's positions on a large world grid, and an automatic pilot takes you to the nearest enemy infestation. Your arsenal of equipment includes a running radar display; heat-seeking guided missiles; and clock, fuel, speed, shield, and altitude indicators. There are more things to look at on your control panel than Han Solo has in his hobby room—not to mention the view outside the window!

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The Action

Skyfox is not quite a flight simulator, but it's close. You launch like something out of "Battlestar Galactica." Once you are out of the launch tunnel, the horizon tilts and wheels, dips and rises, as you move the joystick right and left, forward and back. Below you, tanks approach; above you, planes are visible. Pressing button 0 fires bullets—or blips, or whatever—and the planes and tanks blow up. Pressing button 1 releases a heat-seeking guided missile.

> The horizon tilts and wheels, dips and rises, as you move the joystick.

After you've destroyed all the planes and tanks you can find, you get to go after the mothership, which is big, very big. It's also extremely hard to destroy. I never could get close enough to blow one up, but it must be possible.

Skyfox doesn't require a lot of strategy, but it does provide a lot of action. It's probably best for boys under the age of 13. I could get involved in it only by pretending that the tanks were bill collectors and the planes were lawyers. Now *that* was exciting!

David Gerrold

Skyfox
Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171
List Price: $40
Requires: Apple II, II Plus, IIe, or IIc; 48K RAM; one disk drive; two-button joystick

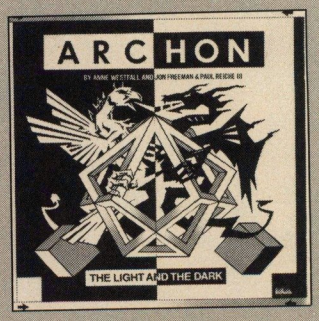
CIRCLE READER SERVICE NO. **355**

A KAMIKAZE VERSION OF CHESS

I have high praise for Archon, a game that puts you into complex battles requiring arcade skills, as well as strategic thinking—but more of the former than of the latter.

Archon comes from Electronic Arts and was written by Anne Westfall, Jon Freeman, and Paul Reiche III. It is a kind of kamikaze version of chess, using magic, hand-to-hand combat, and a quicksand playing board. The square your piece is standing on changes colors regularly, thereby affecting the strength of your character.

The tactical board of the game is laid out like a chessboard, but unlike in chess, you don't have pawns or rooks in Archon. You have Valkyries, golems, unicorns, djinni, wizards, phoenix, knights, and archers on one side—and, on the other,



banshees, trolls, basilisks, shapeshifters, sorcerers, dragons, manticores, and goblins. All of these creatures have different strengths and abilities. None of them have very nice personalities, so conflicts between them tend to be . . . ah, violent—and usually short.

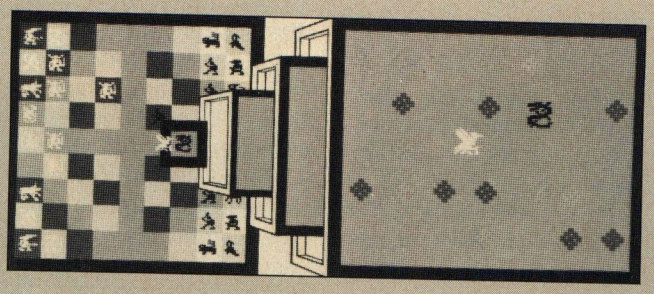
In addition to all of the above, Archon includes magic spells. The manual, which reads like a module from Dungeons and Drag-

ons, describes teleportation spells, healing spells, time-shifting spells, resurrection spells, imprisonment spells, and even a spell that summons elemental demons.

The Battles

When two pieces land on the same square, they fight it out; the game switches to an arena screen and the battle begins instantly. The joystick moves the character, and the button fires its weapon. The battles bring out each character's abilities. Creatures with a lot of strength and endurance are much more likely to win a fight than creatures with little of either. Naturally, the survivor wins the square.

I found the battle part of the game to be the trickiest. Some characters "reload" quicker than others, and some can't seem to fire their



weapons in certain directions. Some characters just feel easier to use. I spent the better part of a day just fighting battles so I could find out what each character could do in combat. At the end of the time, I still wasn't totally certain.

Complex and Challenging

Be prepared to spend a lot of time just learning all the possibilities in the game before you actually start to play. Possibly the game's only flaw is the amount of work it takes to learn it. On the other hand, the game is complex enough to present a challenge to even the most dedicated gamester.

For the average person, though, Archon may present too many possibilities. The appeal of chess, for instance, lies in the great wealth of possibilities that exist in the different relationships of the pieces on the board. Perhaps Archon best suits those people who are impatient with the subtleties and demands of chess and who prefer a game that plays more like a free-for-all than like a deliberate contest of strategy.

One or two people can play, and it helps if they don't like each other very much. If they do, they probably won't by the time the game is over. Be prepared to get involved in the fates of your characters because they tend to take on lives of their own. You won't like seeing them killed off, and you won't like the person who does it. I expect Archon to break up many wonderful friendships.

David Gerrold

Archon
Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171
List Price: $40
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THE JOYS OF SLOW BALL

Unlike the frenetic excitement of football and basketball, baseball is appealing because it's out of pace with the modern world. It's a casual game with infrequent thrills that punctuate long, lazy summer afternoons.

You can sit in the stands, drink a beer, talk statistics, argue about the designated-hitter rule, compare the '74 A's with the '34 Cardinals, and try to figure out the opposing team's signs—all while waiting for a single pitch.

Unfortunately, that unique pacing—the thing that's most appealing about baseball—is the hardest thing to capture when creating a computerized version of the game.

Most computer baseball games don't even try. Instead, they simplify the sport and speed up the action—ignoring strikes and balls, allowing only two or three different types of pitches, even cutting the game down to three innings.

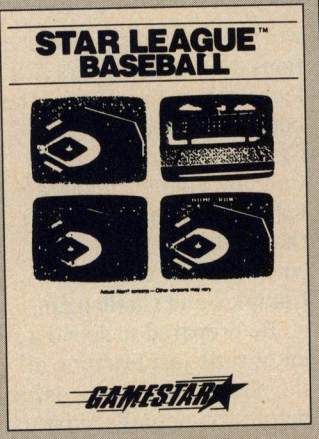
But Star League Baseball from Gamestar is as slow and relaxed as the real thing. It's hardly the perfect computerized version of the game, but, for a fanatic, it's a satisfactory substitute.

A Few Caveats

Realistically, Star League Baseball requires a color display. Playing it on a monochrome monitor is like watching a postseason playoff game in snowy Toronto.

It requires a joystick. I tried playing it with regular game paddles, but my infielders kept wandering out to the right-field fences, apparently demanding that they be given a less-challenging position on the field.

To top it all off, the Star League Baseball manual was written for Atari users. Apple owners must refer to the addendum to translate Atari commands into Apple commands.



Maybe I've just had too many softballs bounce off my head, but I really had trouble figuring out what to push when, especially when I first started. Add that to the fact that the people at Gamestar say the Atari display is a bit sharper, and you'll probably reach the same conclusion I did: If you have access to an Atari home computer, this instance may be the one time you'd prefer to buy a program for it instead of for your Apple.

The Game

Visually, Star League Baseball is quite agreeable, complete with stands, scoreboard, lush green field, and players that are as detailed as you could reasonably hope for. (A Macintosh version of the game is promised that will, of course, sacrifice color but add a fine level of detail to the players.)

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Applied Engineering and Apple computer have teamed up to take your IIc to new heights.

Applied Engineering's Z-RAM card for the IIc is available with 256K or 512K of additional memory and a powerful Z-80 microprocessor for running CP/M software.

Z-RAM fits neatly inside the IIc. Installation is easy, clear instructions show you how. You'll need a screwdriver and about 10 minutes (if you can change a light bulb you can install Z-RAM).

Z-RAM and Appleworks will knock your socks off.

A 256K Z-RAM will give you a 229K available desktop and Appleworks will be completely loaded into memory. Appleworks will now run about 10 times faster in your IIc with 1 disk drive than in other IIc's with two disk drives. A 512K Z-RAM will give you a 413K available desktop. A 256K Z-RAM can be upgraded to 512K at a later date when your needs grow.

Z-RAM is also a high speed solid state disk drive. With Z-RAM your programs will load and save over 20 times faster. Z-RAM's RAM disk is compatible with Applesoft, Pro-DOS, DOS 3.3, PASCAL and CP/M. And with Z-RAM you can copy a disk in one pass. Just insert the original, remove the original, insert blank disk! That's it! Z-RAM is another disk drive, only 20 times faster, 4 times larger capacity, and no whirring, clicking or waiting!

But before you start panting over all that extra memory, don't forget that the Z-RAM card has a built-in high speed Z-80 processor chip that allows you to run CP/M programs like Wordstar, dBASE II, Turbo PASCAL, Microsoft BASIC, FORTRAN and COBOL and over 3,000 other CP/M programs. So Z-RAM not only makes Apple programs run better and faster, it lets you run MORE programs.

With the Z-RAM card installed, your IIc is still your IIc only now you'll have that extra memory that Appleworks and other programs need. And you can run all that great CP/M software that others can only dream about.

Z-RAM is 100% compatible with all IIc software and hardware including the mouse, 2nd disk, modem and printer. Z-RAM is easily handled by the IIc power supply as power consumption is kept very low by using two custom integrated circuits and a patent pending power saving design. And Z-RAM is from Applied Engineering, the acknowledged leader and innovator of accessories for the Apple.

Z-RAM comes complete with manual, RAM disk software, Z-80 operating system, CP/M manual and a 3 year no hassle warranty.

So the next time somebody asks you why you didn't get an IBM P.C. tell him you bought a IIc because the IBM didn't have enough memory and was too slow and couldn't run CP/M software. And tell him you made it past the 8th grade.

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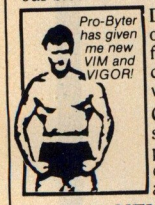

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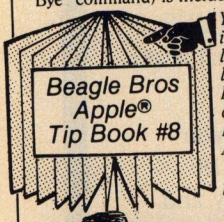
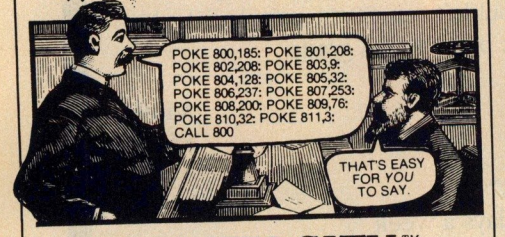


You get a GOLD MINE of tips, including: How to use memory like an extra disk drive (ProDOS lets you load & save files in RAM), How to disable the LIST command so it says "File Locked", How to disable or swap ANY command, How to change "Startup" to any name, How to personalize ProDOS catalogs...



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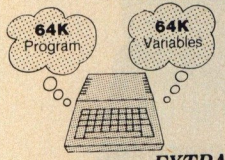

Your Applesoft programs can now function undisturbed in main memory while all variables, strings and other data reside in your Apple's massive extra 64K. Everything functions normally—no special commands or procedures required.

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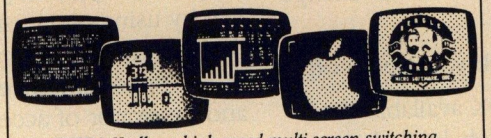

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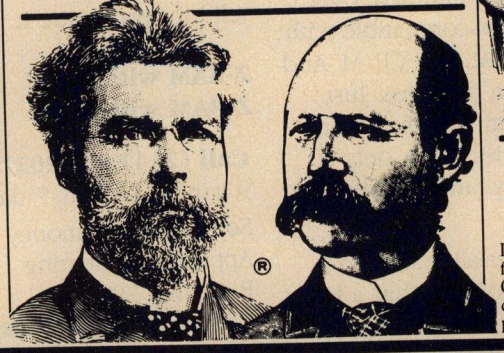

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```
10 FOR X=0 TO 17: READ A:
   POKE 12345+X,A: NEXT:
   DATA 173, 48, 192, 136, 208, 4,
   198, 0, 240, 7, 202, 208, 246,
   166, 0, 208, 239, 96
20 N=RND(1)*6: R=1+RND(1)
   *66: FOR X=1 TO N: POKE
   0,R: CALL 12345: NEXT
30 GOTO 20
```

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Keyboard errors are caught as you type. If you enter an illegal program line, you are told immediately—*before* you (or worse—someone else) runs your program. Or you may simply type "CHECK" to scan an *entire program* in a couple of seconds and uncover potential crashes. If no mistakes are found, you get an immediate "NO ERRORS" message.

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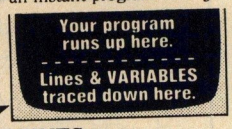
When a program stops or crashes, type "DUMP" to see the last 10-10,000 statements and line numbers that were executed, in the order executed—an instant program *history.*

D CODE features sophisticated "live" tracing too, with each executing statement, line number and selected variable values appearing in a window at the bottom of the screen:



BREAKPOINTS

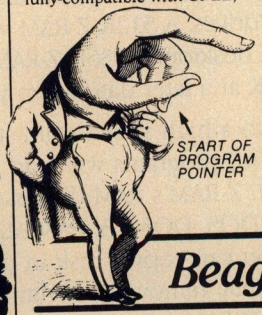
D CODE lets you set up de-bugging "breakpoints" so your program stops when you want. For example, you can ask that your program be stopped the moment X gets set to 99, or the 3rd time a particular program statement is encountered.

LIGHTNING-FAST FIND!

D CODE lets you find strings and variables *fast*—even large programs can be searched in about *2 seconds!* All lines with a specified word are automatically listed with the word highlighted. This feature alone is worth the price of D CODE.

GPLE COMPATIBLE

D CODE remains "transparent" to your programs and is fully-compatible with GPLE, Double-Take, ProntoDOS, etc.

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11 TEXT
22 HOME
33 FOR A=0 TO 255
44 FOR B=69 TO 73
55 POKE B,A
66 NEXT
77 VTAB 9
88 CALL-1321
99 NEXT
```

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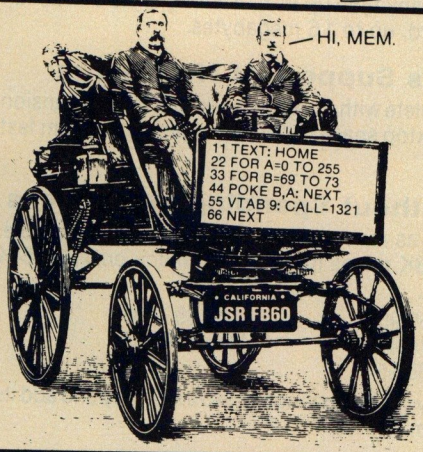

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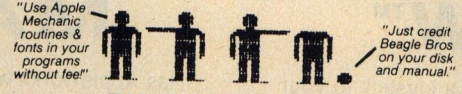

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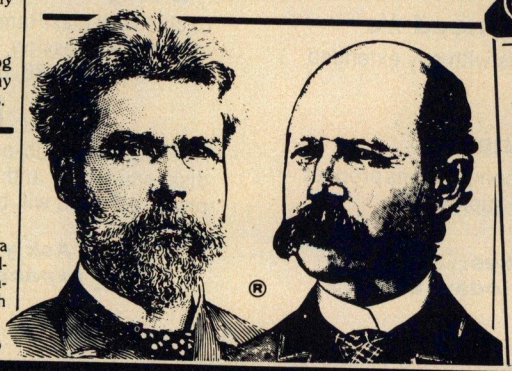

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CIRCLE 128 ON READER SERVICE CARD

across the field, experience virtually everything short of seeing the fans scramble for a foul ball.

As a bang-the-ball, whiff-the-batter type of game, Star League Baseball stands up well to anything else. You can choose between two pitchers to start the game, each with an eight-pitch repertoire, and even bring in a late-inning knuckleballer to handle relief. The action is demanding, but lifelike, requiring you quickly to switch gears between pitching, fielding, and picking off opponents.

When you're batting, you can bunt, hit away (as in real baseball, *when* you hit affects *where* you hit), or take pitches that look high or outside.

Low on Strategy

As a strategy game, though, Star League Baseball falls short. Although the package promises that you can "choose your own starting team," all you really get to decide is whether your team is to be made up of sluggers or line-ball hitters. From that point, however, there's no subtlety to the selection. You don't, for instance, set a lineup that puts a power hitter in the number 4 position, or a weak hitter in the number 9 spot. Thus, you don't get to make the kinds of decisions that a manager makes. Every hitter is the same, and, when you're playing, you're just one of the gang.

A Game for Baseball Fans

Star League Baseball is designed for one-player play against the computer (a pretty tough opponent) or two-player play. You can practice your batting in a nongame situation, but not your fielding—a problem, since playing the field in Star League Baseball is actually pretty complicated. In fact, I lost a few 40–0 games to the computer before I figured out exactly what to do.

All in all, it's safe to say that Star League Baseball won't take over for the real thing, but it does take just about as much time and can give the rabid fan something more to rave about.

J. Anthony Dirksen

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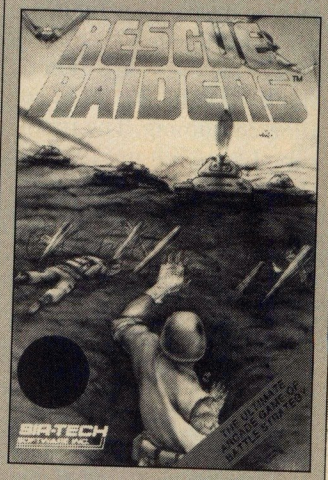
I know you're expecting a review of Rescue Raiders, but I don't think I'm going to have time to write it. You



see, I've gotten as far as level 4, but I keep getting killed. Each time that hap-

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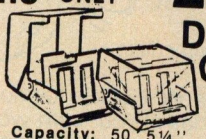

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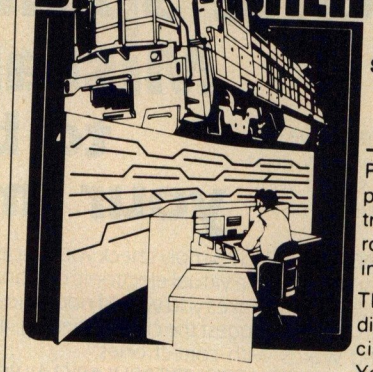

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CIRCLE 341 ON READER SERVICE CARD

pens, I have to start over, but this time I think I've got it figured out. I'll know as soon as I get back to level 4. A couple of weeks ought to do it. Fortunately, a Save Game feature allows me to keep the game going for as long as it takes—if I don't get killed again.

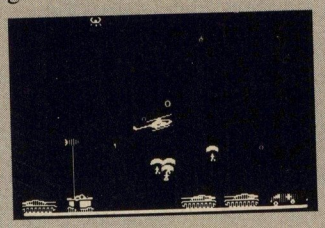
Let me tell you, I didn't think the game would be so time-consuming. The first time I booted it up, I thought it was just another version of Choplifter. The same joystick-controlled helicopter was flying along a horizontally scrolling battlefield—only this time, instead of rescuing hostages, the player's job is to drop bombs on enemy tanks and troops. "Ho hum," I said, "It's just another shoot-'em-up." But I figured I ought to try playing it a little before I wrote about it. That was three weeks ago. Rescue Raiders is definitely not just another shoot-'em-up. (By the way, my agent wants to know why I'm three weeks late turning in my new novel!)

▶ Just make sure you have enough helicopters.

Modern World War II

The game's description sounds odd: the idea is that it's World War II fought with modern technology—tanks, helicopters, smart missiles, and so on. You see, these terrorists have got hold of a time machine—never mind, you don't need to know the details. Just make sure you have enough helicopters and tanks.

Helicopters are especially important, because when you run out of them, the game is over. A long bar

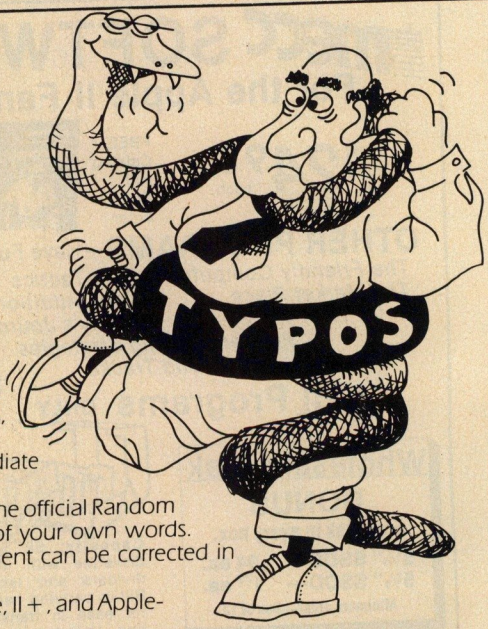


across the top of the screen represents the battlefield and shows you where everything is and what's going on at all times. The main screen shows you what's going on in the vicinity of your chopper.

The east end of the battlefield is your base; the west end is the enemy base. You need a two-button joystick so you can fire machine guns, drop bombs, and release smart airborne missiles. The missiles are extremely useful for shooting down enemy helicopters—except sometimes the enemy fires back and you have to do some ticklish evasive maneuvers to avoid being blown to bits. Oh, did I mention how much I like the animation in this game? I especially like the way the airborne missiles drop out of the helicopter and head west—but I don't like the way they sometimes misfire and crash.

You can also deploy troops (five at a time), engineers (two at a time), tanks, antiaircraft-missile carriers, and demolition-team vehicles. Once deployed, they travel steadily west, destroying every enemy soldier or vehicle in their path until they are destroyed themselves. You can give them air cover, of course, and even fly ahead to take out oncoming tanks, but you

It takes only One Spelling Mistake to blow your image



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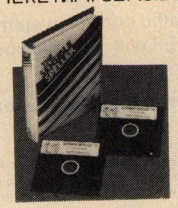
WHERE MAY SENSIBLE SPELLER BE PURCHASED? It is available at your dealer for $125 in either the "IV"* or ProDOS version.*



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CIRCLE 227 ON READER SERVICE CARD

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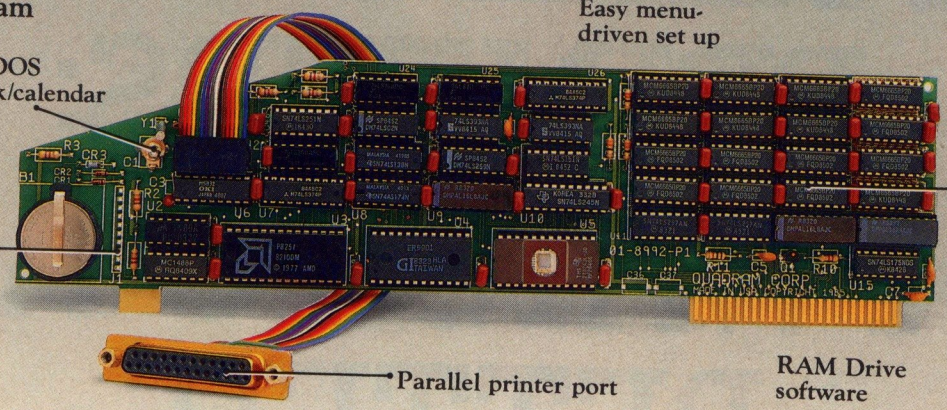
Quadram expands the power of the Apple II series personal computers. Quadram set the standard with the Quadboard. Now we offer you Multicore, the card that delivers RAM expansion to 256K, parallel and serial ports, a ProDOS clock/calendar, and RAM drive software. Plus, there's the new Extended Multifunction Card, Clock/Calendar Card, Serial Interface Adapter, and Buffered Serial Interface Adapter. All designed to bring out the best your Apple has to offer. For further details on these cards as well as our popular APIC parallel interface and eRAM 80 cards visit the dealer nearest you, or contact us at 4355 International Blvd., Norcross, Georgia 30093 (404) 923-6666.

Multicore by Quadram



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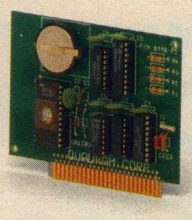
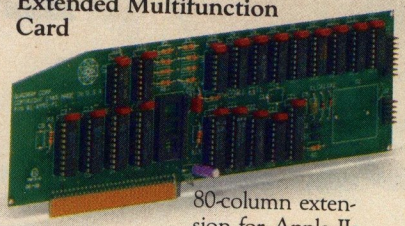
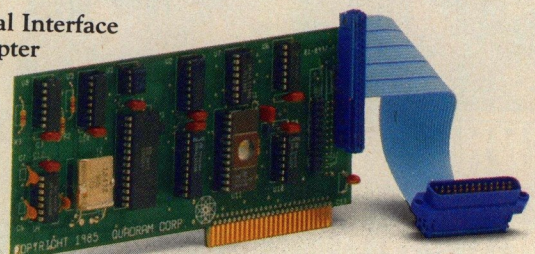


Extended Multifunction Card



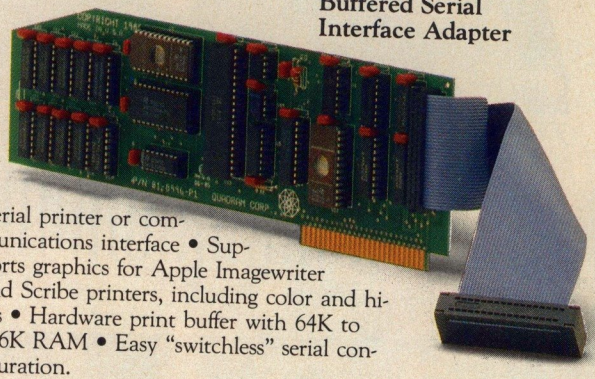
80-column extension for Apple IIe • 64K RAM expansion option • Color RGB interface • ProDOS clock/calendar.

Serial Interface Adapter



Serial printer or communications interface • Supports graphics for Apple Imagewriter and Scribe printers • Apple Super Serial Card compatibility • Easy "switchless" serial configuration.

Buffered Serial Interface Adapter



Serial printer or communications interface • Supports graphics for Apple Imagewriter and Scribe printers, including color and hi-res • Hardware print buffer with 64K to 256K RAM • Easy "switchless" serial configuration.

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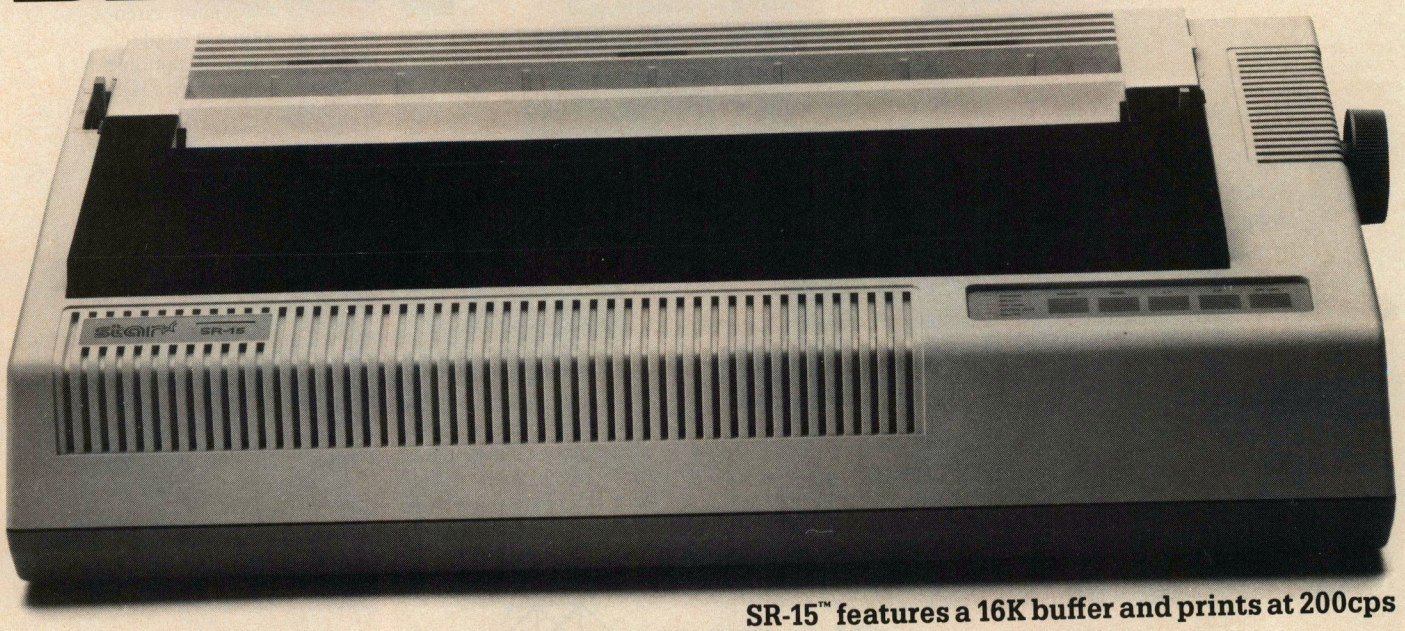

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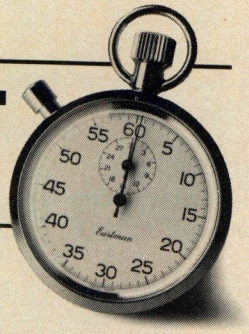

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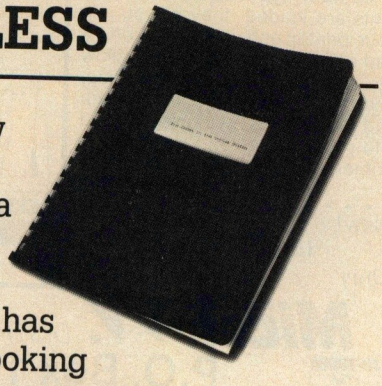
16K AND NOT A BIT LESS



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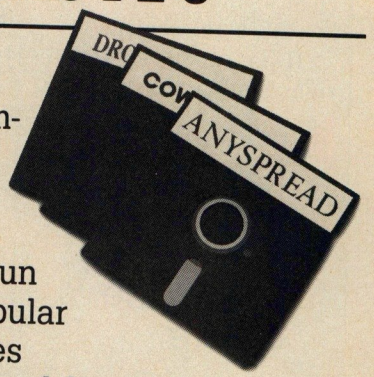

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have to watch out for the enemy's missiles and antiaircraft emplacements.

If you can deploy the right combination of tanks,

> Each battle feels at least twice as challenging as the one before.

antiaircraft-missile carriers, troops, engineers (to repair your antiaircraft emplacements), and demolition vehicles (if just one of these gets through, it can destroy the enemy time machine), you can win the battle. There are eight battles—and each one feels at least twice as challenging as the one before. What makes it even harder is that every time you deploy resources, it costs you bucks. Further, your supply of bucks is limited and replenishes quite slowly. A new helicopter costs five moneybags; a tank costs one. An antiaircraft-missile carrier costs only three minimoneybags; it's a good idea to deploy a lot of antiaircraft-missile carriers. They automatically shoot down any enemy chopper within range.

No Simple Shoot-'em-up

Thus, even though Rescue Raiders looks like just another simple shoot-'em-up, it's really a sophisticated game about managing resources. The strategy is to use your limited income to deploy your army most effectively.

Listen, I know you're impatient for me to write a review of Rescue Raiders, but I don't think it's fair to write about a game when I've had such a limited amount of exposure to it. I think I should try to go all the way up to level 8 and make sure that my evaluation is fair. I think if I work at it every weekend and most of my evenings, I can probably be finished by Thanksgiving Day, and you could have the review in time for the Christmas issue of *A+*. How does that sound?

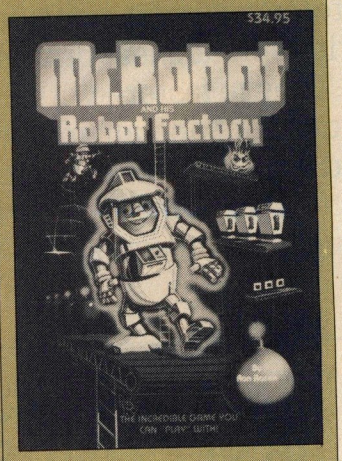
Yours truly,
David Gerrold

Rescue Raiders
Sir-Tech Software, Inc.
6 Main Street
Ogdensburg, NY 13669
(315) 393-6633
List Price: $34.95
Requires: Apple II, II Plus, IIe, or IIc; 64K RAM; one disk drive; joystick

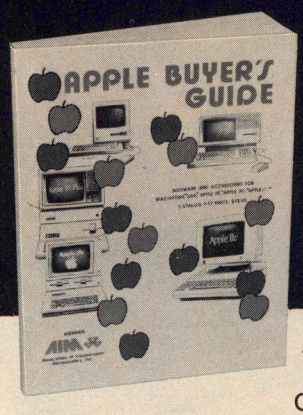
CIRCLE READER SERVICE NO. **356**

INDUSTRIAL-STRENGTH ACTION

Every once in a while, an arcade game stops you dead in your tracks. It possesses



that unique combination of action, graphics, and challenge to lure you back to the Apple time and time again. Although easy to play, it is



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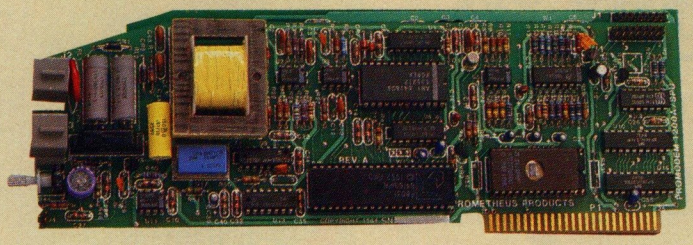

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Features include: Auto-dial/Auto-answer, tone and pulse dial, help commands, built-in diagnostics, two phone jacks, line status detect with redial on busy, full and half duplex and speaker with volume control.

You just can't lose when our plug-in ProModem 1200A comes ready to use, with on-board software, easy to understand documentation and a telephone cord — all for just $449.

A Powerful Menu-Driven Terminal Program

```
1200A TERMINAL DRIVER
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```

```
1} COMMUNICATIONS
2} FILE TRANSFER
3} OPTIONS
          USE ESC TO EXIT
          ENTER SELECTION
```

```
1} BAUD RATE  1200  300
2} DATA BITS  8  7
3} PARITY NONE ODD EVEN MARK SPACE
          USE ESC TO EXIT
          ENTER SELECTION
```

```
1} TYPE        XMODEM  LINE
2} DIRECTION   SEND  RECEIVE
3} FILE NAME
          USE ESC TO EXIT
          ENTER SELECTION
```

```
1} PRINTER       ON  OFF
2} CLOCK         ON  OFF
3} STATUS LINE   ON  OFF
4} KEYBOARD      ON  OFF
5} CAP LOCK      ON  OFF
6} ECHO          ON  OFF
7} LF AFTER CR   ON  OFF
          USE ESC TO EXIT
          ENTER SELECTION
```

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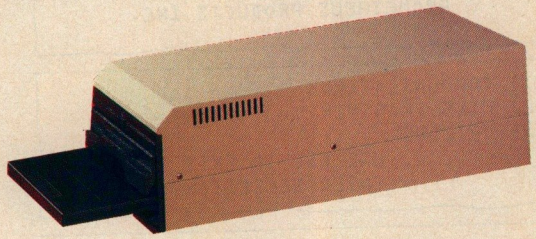
The Infax 101A gets right to the core of storage problems for your Apple!



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The Infax 101A features a removable 10 megabyte data cartridge. Your Apple* can have almost infinite storage capacity with the new Infax 101A.

Look at the features the Infax 101A offers: ★ Bernoulli technology ★ Highest performance, reliability of any removable disk drive. ★ Lowest cost 10 megabyte (formatted) data cartridge. ★ More resistant to shock and vibration than any other fixed or removable disk drive. ★ Fastest start / stop (cartridge replacement) time of any high performance disk drive. ★ Non-contact head to disk interface. ★ Micro-processor-based error correction. ★ User transparent error detection and correction. ★ Automatic start-up diagnostics, idle drive shutdown, error recovery procedures. ★ Host adapter / controller and software supports up to 4 drives simultaneously. ★ Cartridge write protect switch.

Now the Infax 101A supports Apple III, S.O.S. and Apple II ProDOS!

The Infax 101A comes with disk drive, data cartridge, power supply cables and personal computer adapter. Software included supports Apple* DOS 3.3, Pascal and CP/M microsoft card CP/M version 2.23** Also included are support software for quick copying, backup and file management. Slot independent. Supports auto-boot capability. Infax is a registered trademark of D² Products. *Apple, Apple III, Apple II ProDOS and S.O.S. are registered trademarks of Apple Computer, Inc. **CP/M is a registered trademark of Digital Research, Inc.

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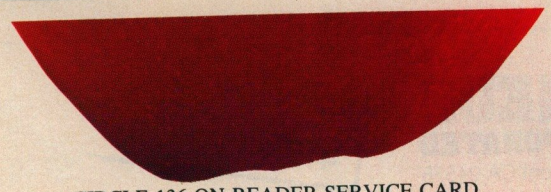

CIRCLE 136 ON READER SERVICE CARD

difficult to master and becomes trickier with each passing level. Mr. Robot and His Robot Factory is one of those games—exciting, frenetic, and addictive.

The game is a cross between Pac-Man and Donkey Kong. The object is to guide Mr. Robot around a factory and pick up power pills before his energy runs out. This factory is a real metallic jungle—treadmills, ladders, escalators, sliding poles, trampolines, bombs, magnets, and transporters. Worse, "alienfires" roam the floors trying to grab and melt Mr. Robot. Only touching an energizer brings a temporary respite from the flames of the alienfires.

> 'Alienfires' roam the floors trying to grab Mr. Robot.

The graphics are colorful, if not overly spectacular. Mr. Robot and His Robot Factory emphasizes heart-pumping action, rather than fancy graphics. Still, you can easily distinguish between different objects, and the screen images are a cut above those of arcade games such as Lode Runner (see *A+*, May 1984, pages 129–131).

Challenging Action

The game holds 22 floors of challenging action. The eighth floor (level H), nicknamed the Trampoline Floor, presents the first apparently insurmountable obstacle. The solution is to bounce to the top of the screen, collect the power pills, and then jump off the right edge. If you time your leap correctly, you will touch the energizer and bound down four trampolines, eliminating the alienfires on each one.

Then—and this is the real key to the screen—jump to the right as if to jump off the screen. You will bounce off the screen border to the trampoline below. The rest is a simple matter of jumping and running, but do not forget to grab the bonus robot token in the middle of the screen. You will need every robot you can get to clear the more straightforward—and more difficult—9th floor (level I).

The game also includes a build-your-own factory module. You can create up to 26 of your own devious screens using any and all of the shapes, obstacles, and tricks contained in the preprogrammed game. Lode Runner had this feature and the result was a sequel, Championship Lode Runner (see *A+*, February 1985, pages 187–188), with 50 exceptionally tough screens. I think a Championship Mr. Robot is an equally good idea.

Be forewarned: Mr. Robot and His Robot Factory is addictive. It will keep you glued to your Apple for a long time. An exceptional blend of time-tested elements forms a truly challenging and exciting game. I highly recommend Mr. Robot and His Robot Factory.

Russ Lockwood

Mr. Robot and His Robot Factory
Datamost
8943 Fullbright Avenue
Chatsworth, CA 91311
(818) 709-1202
List Price: $19.95
Requires: Apple II Plus, IIe, or IIc; 48K RAM; one disk drive; joystick

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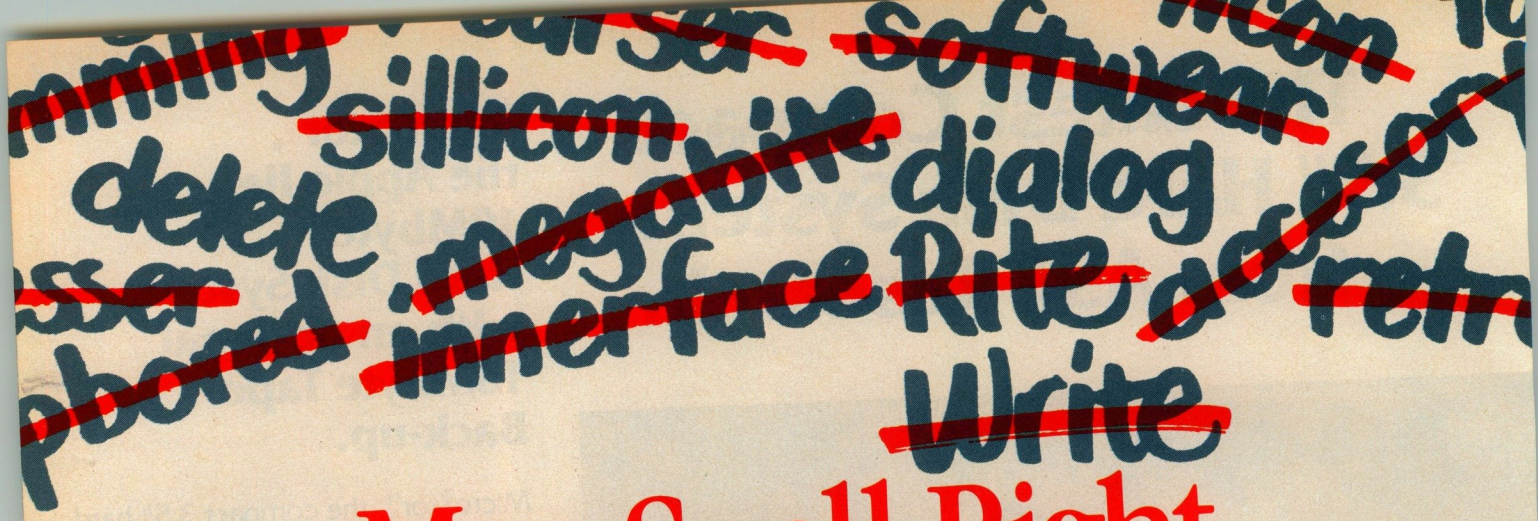
CIRCLE 323 ON READER SERVICE CARD



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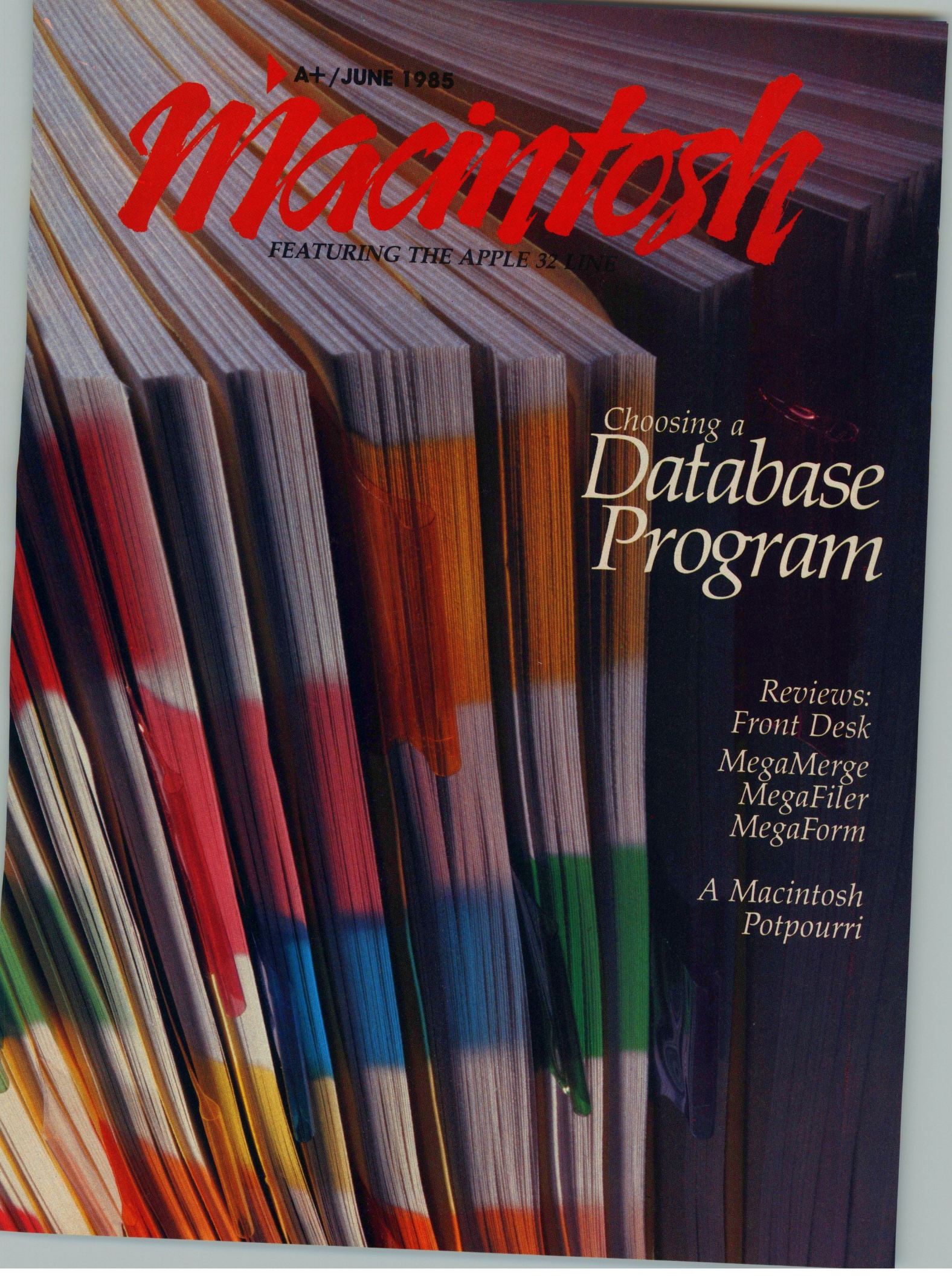
A+/JUNE 1985

Macintosh

FEATURING THE APPLE 32 LINE



Choosing a Database Program

Reviews:
Front Desk
MegaMerge
MegaFiler
MegaForm

A Macintosh Potpourri

THE ELECTRONIC FILE FOLDER

Choosing a database program

As recently as a few months ago, complaints were rife about the lack of software for the Macintosh. Now a plethora of programs are out there.

If a database manager is what you need, you can choose from the dozen or more programs that are now available, but you probably wonder how you will be able to pick the one that best meets your needs. For that matter, you may even wonder if you need one at all—that box of tattered index cards has worked all these years, right?

Should you be unfamiliar with the purposes and power of database programs, some general information may help you resolve the question of whether or not you need one. Once you have decided you need such a program, start your research. Find out what features are available and which programs have those features.

The charts that accompany this article (see pages 111 and 116) rate 13 Macintosh database programs in various performance areas. Use the information in the charts and the guidance the article provides to help determine your database needs and the program that meets them.

A database is a collection of information—any kind of information, from names and addresses to the particulars of your customer accounts or even graphic images. A database manager, or file manager, is a program that lets you collect, organize, maintain, and manipulate your information. It also allows you to print various reports that are usually selective summaries of the information.

What are the advantages of an electronic database over any of its paper counterparts? You can store more information in less space, retrieve it more quickly, have calculations performed automatically, and easily vary the printed output.

The three most important terms in database management are *file*, *record*, and *field*. A file is a collection of records, much like a file box that holds index cards. A record is analogous to a single card in the file—a collection of related information, such as the name, address, and telephone number of one person. A field is a single piece of information, such as a name or a telephone number.

Beyond the basics of files, records, and fields, programs offer varying levels of manipulative ability: alphabetical and numeric sorting, the selection of groups of records with something in common, and so on.

When shopping for a database-management system (DBMS), the first thing to do is ask yourself three important questions: How much information can the program handle? How many ways can that information be manipulated? How well does the program perform in the areas that are important to you?

To help narrow your list of prospective DBMSs, check your needs against the data in the Vital Statistics chart (see page 111).

Do you need the extra power of a relational system? With a relational DBMS, you can link together the records of two separate files into a single temporary file. By assigning one customer the same customer-identification field, you can, for instance, tap into a customer name-and-address file while processing the orders stored in another file. You will not have to enter or store the name and address in the order file, which results in a considerable saving of both time and storage space if customers place multiple orders.

How much data do you need to store? With most DBMSs, the amount of room on the disk is the only limit on the size of your file. The number of records you can have in a file depends on the amount of information in each record. The number of characters that you can put in each field is important: if you want to enter syn-

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File Print Edit Find Analyze Math SetUp Attributes

Any Text
✓Alphabetic
AlphaNumeric
Numeric
Phone
Money
Date
Time
YesNo
Right Flush
✓Word Caps
All Caps
No Duplicates
No Unique

Phone Bill

Date	City	St	Area	Phone	Time	Rate	
01/14/84	LosAngeles	CA	213	383-2225	13	DN	
01/15/84	Placentia	CA	714	993-7836	91	DN	
01/17/84	Pasadena	CA	213	793-1140	1	DE	
01/17/84	Pasadena	CA	213	793-1140	10	DE	
01/17/84	Anaheim	CA	714	991-4328	42	DE	
01/18/84	Glendale	CA	213	247-9247	3	DE	
01/18/84	Glendale	CA	213	247-9247	7	DD	
01/18/84	LosAngeles	CA	213	851-2529	7	DD	
01/19/84	Glendale	CA	213	247-9247	6	DD	
01/19/84	LosAngeles	CA	213	487-5000	2	DD	
01/19/84	LosAngeles	CA	213	487-5000	1	DD	
01/21/84	LosAngeles	CA	213	850-6575	8	DN	
01/23/84	Riverside	CA	714	783-0746	1	DE	
01/26/84	Orange	CA	714	634-2553	3	DE	
01/29/84	Anaheim	CA	714	533-6619	27	DN	1.00 GTE
01/29/84	Anaheim	CA	714	533-6619	63	DN	2.30 GTE
02/02/84	LosAngeles	CA	213	383-2225	2	DD	.51 GTE

Figure 1: ProVUE's OverVUE gives an almost overwhelming choice of "attributes" for field formats. The columnar arrangement of information allows you to see more than one record at a time and makes data entry very easy. This columnar setup is the only one available in OverVUE; some programs allow you to toggle between such an arrangement and a free-form record design.

opses of the books in your professional library, a 40-character limit will be very frustrating.

How do you want to organize your records? Some programs let you sort alphabetically or numerically on only one field at a time. A multilevel sort can arrange your records by ZIP code, also alphabetizing names within each ZIP area. A program with "infinite" sorting levels lets you sort on as many fields as a record contains.

Do you need to view more than one file at a time? Some programs allow multiple open files but do not let you transfer information easily.

Once you have a list of the database programs that can handle your overall filing needs, you can start thinking about the finer points.

The first thing to do when setting up a database is to design the records: name the fields, define their sizes, and determine their placement on the screen.

Methods of defining the field size vary, from typing in the number of characters to tracing an area of the screen, but you always have to plan ahead. (Well, not always—Microsoft File and OverVUE, for example, let you go ahead and type, and you can change the size of the fields later.)

A good database program lets you easily change your database design as your needs change. The most important editing option is one that lets you add a new field even after you have started to enter information—because that's when you discover you need a new field.

Macintosh databases vary greatly in the amount of available numeric and text-formatting options. Formatting a field so that it holds only dollars, or integers, or a certain number of decimals, saves time when it comes to entering the information—you can enter a 5, and it will appear as $5.00. Most programs allow no text formatting at all and restrict you to the system default font, both on the screen and on paper. If looks are important to you—and the Mac has spoiled us in that area—check on what a program lets you print out.

The final consideration in the realm of record design is the overall design freedom the program provides. OverVUE, for example, has a rigid format reminiscent of a spreadsheet layout (see figure 1). Each record is on a single line, and changing column positions and widths is the extent of your alteration abilities. In contrast, Microsoft File allows very flexible formatting. You can drag fields and labels around, changing their vertical or horizontal dimensions at will (see figure 2).

Field Types

When you are designing the record format of a file, you can usually specify the type of field as well as its name and size. Most programs can at least differentiate between text and numeric fields. Since you cannot enter text into a defined numeric field, you can specify the type of field in order to avoid many data-entry mistakes. The major advantage of numeric fields, however, is that they can be sorted by their value.

The Picture Field

The Macintosh has made it possible to add a new type of field to database terminology: the picture (or graphics-image) field. Microsoft File is the only program I reviewed that offers such a feature. With the advent of reasonably priced digitizers and graphics-editing tools such as MacPaint and MacDraw, a picture field takes on new importance and versatility. How about a digitized picture of a stamp in your collection, an employee in your company, or a logo for your mailing labels?

Some programs require unique fields and some simply allow them. A unique field is one in which the entry must differ from those in all other re-

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Figure 2: This sample record is from Microsoft's File, the most versatile of the databases reviewed. You can use different fonts, styles, and sizes for text, and you can define special "picture fields." The word Ratings *in this record is an independent label, a useful feature also available in some other programs. Another option you should look for in a database program is one that will let you type in blocks of text, such as in the Comments field shown here.*

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CIRCLE 183 ON READER SERVICE CARD

cords. If NAME were a unique field, you could not have two JASON KANTER entries. Unique fields can help keep records straight, but they also constrain your information storage. Ideally, a program should give you the option of naming a unique field and let you override it on command.

A versatile DBMS includes the ability to calculate fields that contain formulas referring to other fields in the record. In this way, for instance, you can have each record show the weekly pay for an employee based on the number of hours worked and the individual pay rate.

Data Entry and Manipulation

Once you have designed your records, it's time to enter information into your file. Two features in particular speed this process: field replication and a global field option.

Field replication allows you to copy a field entry from the last record into the current one. A global field option is similar to field replication: The indicated field automatically fills with the same data in every record.

After you've entered the information, you'll probably want to sort it in order to organize the records. Besides the number of levels it can handle, other qualities of a sorting feature deserve consideration. A program that requires a predefined key makes you decide ahead of time which field is to be the "sortable" one; this rather rigid structure never lets you change your mind.

A program that lets you define one or more fields as an index field sorts more quickly when you choose to sort by those fields. And, if you can't do a reverse sort, you will never be able to list things from the highest priced, highest rated, or highest anything on down to the lowest.

Almost any program lets you select a particular group of records—everyone who owes over $100, for example, or all records from New Jersey—when it's time to print things out. A good feature to look for, though, is a Select option that lets you take a certain group of records and manipulate them further—in effect, this option gives you the ability to work with a subfile.

Whether you are using a Select option to get a group of records or a Search option to look for a single record at a time, the Macintosh databases vary greatly in the way they let you "ask" for records. Decide if you need to retrieve your data by simple search criteria—names that begin with A, for instance—or complex search criteria, such as customer accounts with outstanding (more than 90 days) amounts over $500, who haven't made a partial payment this month.

Although a simple report can be just a columnar listing of the information in your file, it can also be much more than that. A report can let you do cross-record calculations, as opposed to calculating one field that works only within each record. Although a calculated field can give you the weekly pay for each employee, a report can give you the total of your weekly payroll.

You may need a program that can do more than simply add numbers. Some of the functions available in various programs include averaging,

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VITAL STATISTICS ABOUT 13 DATABASE PROGRAMS

	DBMaster	FileVision	1st Base	Helix	I Know...	MacLion	Main St. Filer	MegaFiler	Microsoft File	Omnis 2	Omnis 3	OverVUE	PFS:file
Relational	NO	NO	YES	YES	NO	YES	NO	NO	NO	NO	YES	NO	NO
Records per file	🖫	999	🖫	🖫	🖫	🖫	65,000	10,000	🖫	🖫	🖫	RAM	2900
Fields per record	100	30	100	🖫	10*	25	36	60	1023	120	1440	64	3100
Characters per field	3000	2000	50	🖫	420*	255	40	25*	32,767	60	60	62	2300*
Sort levels	10	1	10	∞	1	∞	8	1	∞	9	9	∞	1
No. of files open	1	1	1	🖫	5	10	1	3	1	1	12	1	1

ADDITIONAL FEATURES

		DB Master	FileVision	1st Base	Helix	I Know...	MacLion	Main Street Filer	MegaFiler	Microsoft File	Omnis 2	Omnis 3	OverVUE	PFS:file
Record Design	Undefined field size		✓		✓					✓				
	Add fields	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	
	Change field size	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Change field label		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	
	Independent labels	✓	✓		✓	✓			✓	✓	✓	✓		
	Numeric formats	◔	○	◑	●	○	◑	○	○	●	◑	●	◑	○
	Text formats	○	○	○	◕	○	○	○	◑	●	◑	◕	◔	○
	Design freedom	○	●	◔	●	◕	○	○	◕	●	◑	◕	○	◔
Field Types	Text	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Numeric	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	
	Date	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	
	Picture		✓		✓					✓				
	Unique (key)	✓	✓		✓		✓				✓	✓		
	Calculated	✓			✓		✓			✓	✓	✓	✓	
Entry/Manipulation	Field replication			✓						✓	✓	✓	✓	
	Default fields	✓						✓			✓	✓	✓	
	Sort without key	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
	Index fields	✓	✓		✓		✓			✓	✓	✓		
	Reverse sort	✓		✓	✓		✓			✓	✓	✓	✓	
	Select option	✓	✓	✓	✓		✓	✓		✓			✓	✓
	Search criteria	●	●	◕	●	◕	◕	◕	◑	●	●	●	●	◕
Reports	Functions	◑	◑	◕	◕	○	◑	◔	◔	●	●	●	●	◕
	Format	◑	◕	◔	●	○	◑	◑	◑	●	◑	●	◔	◑
	Summaries				✓					✓			✓	
Other	List option	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	
	Hidden fields							✓		✓	✓	✓		
	Works on Network										✓	✓		
	Uses passwords										✓	✓		
	Mailing labels	○	◕	○	◕	◑	○	◑	◕	◕	◕	◕	◑	◕

KEY:

*Figure given is probable or average maximum, based on total characters allowed per record, or total of fields and labels allowed per record.

∞ = unlimited

🖫 = limited by disk space

🖫🖫🖫 = can span 44 disks

RAM = limited by available memory

✓ = feature available

blank = not available, or not applicable

○ none

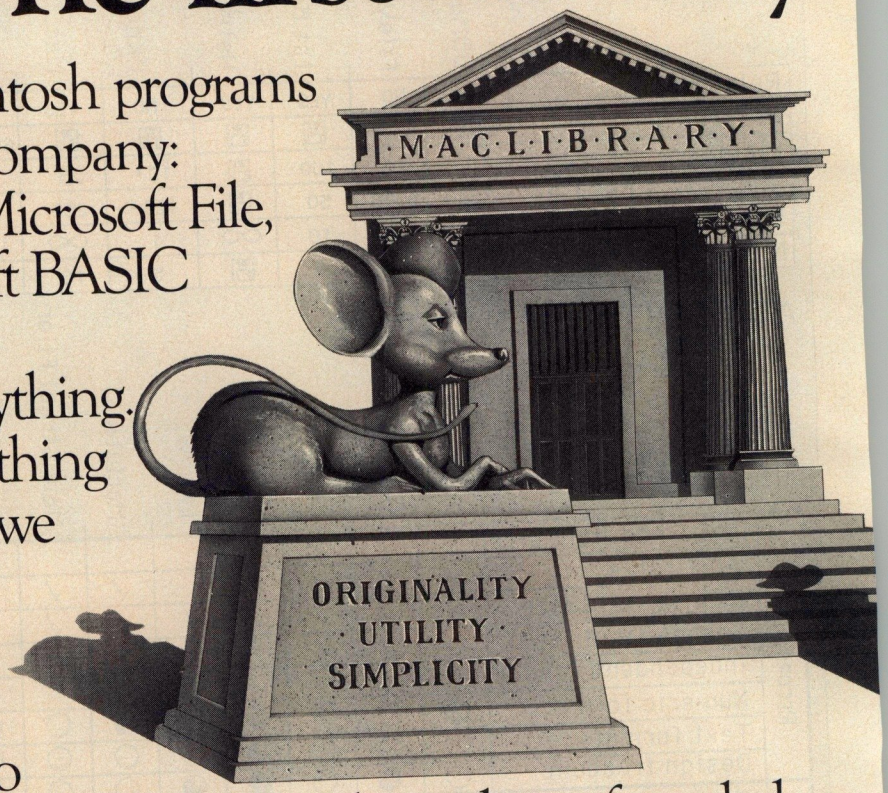
◔ poor

◑ average

◕ good

● excellent

The first library



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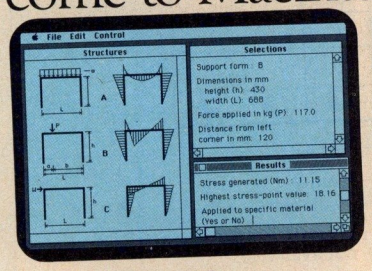

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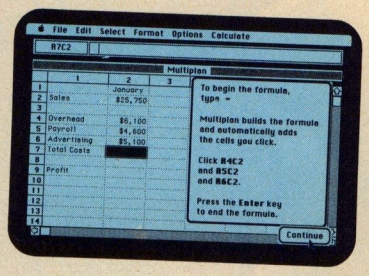

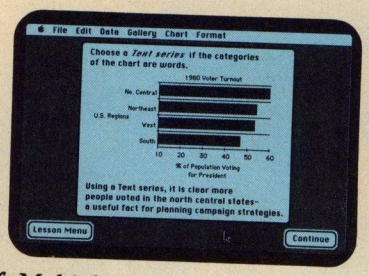

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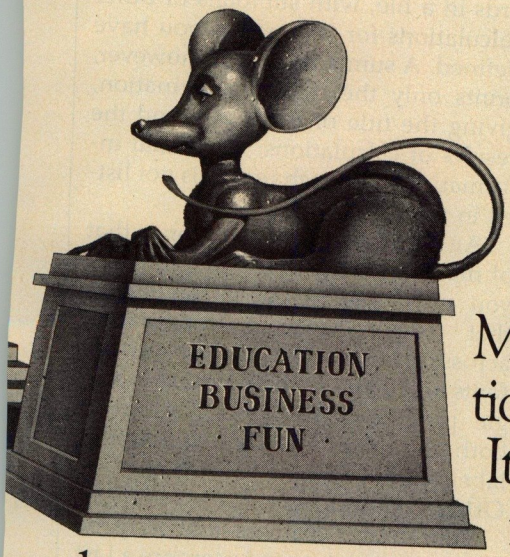

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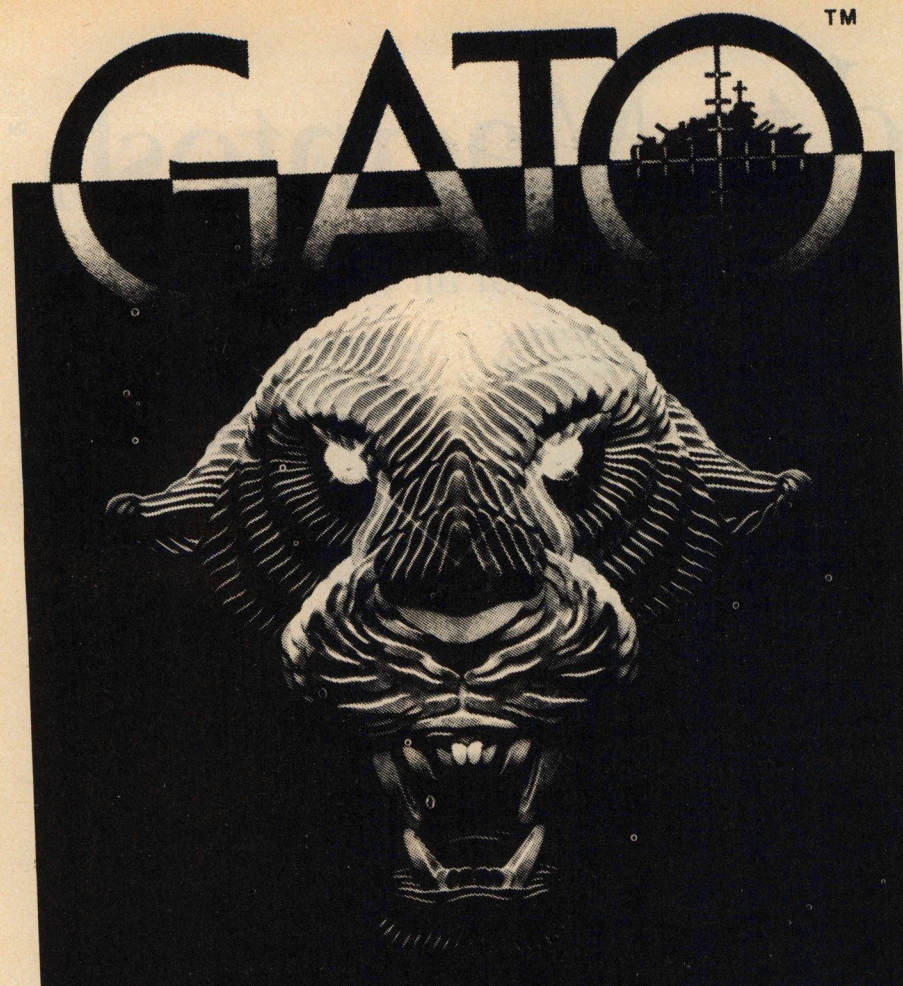

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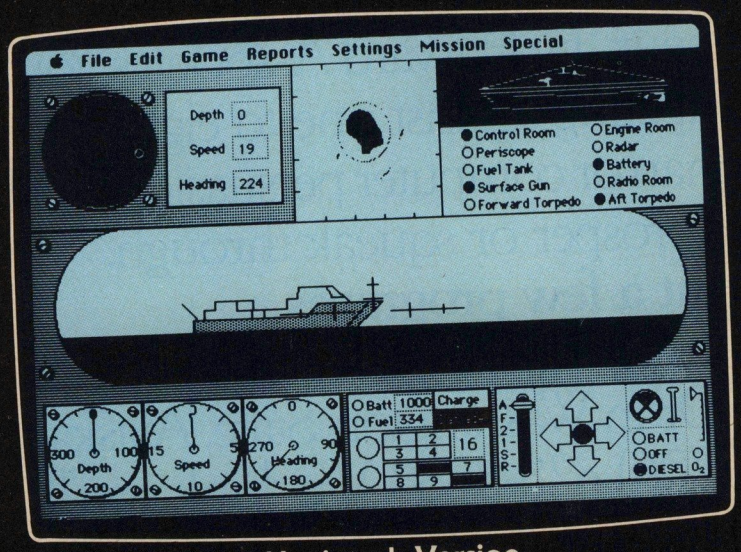

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CIRCLE 233 ON READER SERVICE CARD

counting the items entered, finding the minimum or maximum figures in the column, and even calculating standard deviation.

Almost as important as *what* can be printed in a report is *how* it can be printed. Can you print in different fonts, use boldface, define headers and footers? Can you print field labels? Can you number pages and have a new page start as each new category is printed?

A regular report lists all the records in a file, with subtotals or other calculations for the groups you have defined. A summary report, however, prints only the overall information, giving the title of the group and the results of calculations; the actual information from each record is not listed in the report.

An additional consideration is that of mailing labels. Some programs let you print mailing labels on sheets that contain three or four labels across, and some let you use various fonts and styles in the output. No single program gives great variety in both placement and style of mailing-label output, though.

Other Features

Four minor features that may be important to advanced users are a List option, hidden fields, password protection, and file locking.

Viewing one record at a time and clicking on the Next and Previous buttons to move around in the file can be tiresome. Listing records on the screen makes scanning and data entry easier. (Some programs allow you to list only by designing a report, which you can then view.)

Most programs let you print only chosen fields in a report, and in many programs, some fields do not show on the screen because the record design is larger than one screen size. A true hidden field, however, is one that you can prevent from showing on the screen, which keeps the screen from being unnecessarily cluttered and speeds up your data entry and record reading.

An important consideration for business databases is password protection—can you prevent data in certain fields from being altered, and even being seen, without proper au-

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The discharge of static electricity through the operator's fingertips can pose just as great a threat to your system as power line surges.

The Faulty Ground

In addition to operator safety, a properly grounded computer is better able to drain off charges that would otherwise create dangerous voltage levels between the computer's chassis and microcircuitry. Again, the operator is typically not aware of whether the outlet is properly grounded and therefore risks both the operator's safety and hardware damage.

RFI Can Play Havoc With Your Image

While RFI (Radio Frequency Interference) is not a source of damage to computer or operator, it can play havoc with the monitor image and to software. RFI is caused by nearby radio stations, the operator's own radio or television, as well as other electrical devices. RFI shows up on the monitor as a scrambled image and may also appear as data that has been garbled while in memory. If for no other reason, the computer operator should guard against RFI simply because its effect can nullify the time saving benefits provided by the computer.

MacGard: Real Protection For The Serious User

MacGard from Systems Control is the single most complete computer protection device available today. From its inception, MacGard was designed with Macintosh in mind. From its quality injection molded plastic casing which compliments your Macintosh's appearance, its at your fingertips convenient placement on the side of your unit, and its combination of superior protection features, the MacGard is the ultimate system accessory for your Macintosh.

MacGard provides the serious user with a complete series of protection benefits.

- It clamps off all line to line and line to ground surges *before* they can enter your system.
- It provides an anti-static pad you need only touch to safely drain off harmful static.
- It provides an LED light to indicate proper ground of your electrical outlet.
- It provides RFI attenuation to assure a clean monitor image and software safety.
- A master on-off switch provides convenient control to power up your computer and two other peripherals.
- MacGard has a one year limited warranty.
- If you're not satisfied within 30 days, return MacGard for a full refund.

If you're a serious user, you owe it to yourself to own a MacGard. Your MacGard can only be purchased directly from Systems Control. Cost of the MacGard is $89.95 plus $3.50 for shipping and handling. To order or request more information, call toll free, 1-800-558-2001 Ext. 115, in Wisconsin, 1-800-242-3102 Ext. 115. We accept both Visa and MasterCard. No. C.O.D.

Systems Control P.O. Box 788 M Iron Mountain, MI 49801

MacGard looks and works equally well with the APPLE II, APPLE II+, APPLE IIe, APPLE III, and the APPLE LISA.

MacGard™

A product of Systems Control. A division of M.J. Electric, Inc. Macintosh is a trademark licensed to Apple Computer, Inc.

MacGard is designed to surpass operating requirements for category A as outlined in IEEE Standard 587-1980, "Guide for Surge Voltages in Low-Voltage AC Power Circuits."

CIRCLE 267 ON READER SERVICE CARD

REPORT CARD

	DB Master	FileVision	1st Base	Helix	I Know...	MacLion	Main St. Filer	MegaFiler	Microsoft File	Omnis 2	Omnis 3	OverVUE	PFS:file
Power	●	◑	●	⊕	◔	●	◑	◑	●	●	⊕	●	◔
Performance	◕	⊕	●	●	⊕	●	◕	◕	⊕	◕	⊕	●	●
Ease of learning	◕	◑	●	◑	⊕	◔	◕	●	◕	◕	◑	●	⊕
Ease of use	◑	◕	●	●	●	◕	◑	●	●	◕	●	●	●
Integration level	◔	◑	◕	●	◕	◕	◔	◕	⊕	◑	◕	●	◕
Reports	◑	◕	◔	◕	◑	◔	◕	◕	⊕	◑	●	◑	◔
Data transfer	○	○	◑	◑	○	◑	○	◕	●	◑	⊕	◑	◑
Use of Mac interface	◔	⊕	◕	⊕	◕	◔	◑	◕	⊕	◑	●	◑	◔
Documentation	◔	●	●	●	●	◑	○	●	◕	◕	◕	⊕	●

Key: ○ awful ◔ poor ◑ average ◕ good ● excellent ⊕ outstanding

Figure 3: Report Card rates each of the 13 database programs in general categories.

thorization? Sometimes different levels of protection are available for certain fields, records, or entire files.

Within a networking system, if more than one person at a time tries to access the database, a file can be ruined. A file-locking feature prevents such accidents by limiting access to one user at a time.

If you find it a little mind-boggling trying to consider all of the features and cross-comparisons, take a look at the report card (see figure 3). I have rated each of the 13 programs in general categories, focusing on the following qualities:

Power. How many fields and records can the program handle? Is it relational? Is it flexible enough to meet diverse needs?

Performance. How well does it do what it is supposed to do?

Ease of Learning. How long does it take to learn the basics of creating and handling a file—and how much effort does it require?

Ease of Use. Is it easy to enter data and scan records? Is it easy to get from one record to another? Are there keyboard options for menu selections? Are there ways to enter multiple commands without pulling down the menu repeatedly?

Integration Level. Can you go directly from designing a record form to entering data? Do you have to switch to a separate mode to add, edit, or delete records?

Reports. Can you print in draft/standard/high-quality modes? Can you use different fonts and styles? Can you easily print out different types of "pages"—mailing labels, index cards, lists, reports, envelopes?

Data Transfer. Are the files readable from any other application? Do they link with MacWrite or with another program by the same manufacturer? Can you save them as text files that another program or computer can read?

Mac Interface. How does everything look; how does it work? Are the mouse and menus well integrated into the program environment? Does the program utilize the Mac's graphics capabilities?

Documentation. Is it printed on good paper in a clear typeface, with a decent index and reference section? Is it written in English, technobabble, or Greek?

Charts twice the size of the ones presented here couldn't tell you everything you need to know to make a final decision about a database purchase. You should check other issues of *A+* for in-depth reviews of many Macintosh databases; in the meantime, these additional comments may help:

DBMaster can handle phenomenally large fields that can span 44 disks. You can use fonts and styles on-screen, but not in printouts.

Filevision is a graphics-database program. You can store and retrieve information through pictures that have an underlying database of text information about the objects in a picture.

1st Base is a powerful, well-designed program that is seriously hampered by its draft-quality-only printing and lack of communication with other software packages.

Helix uses the Macintosh interface of icons and windows to the maximum, providing users with a powerful relational database that they can easily control by diagramatically manipulating complex arrangements of data.

I Know It's Here Somewhere is an absolutely perfect little program (see figure 4, next page). It is small, though, and so is suited for use in a home rather than in a business—even a small business.

Computer Software Design's MacLion should probably get an "outstanding" rating for power, because a lot of power is buried in there—somewhere. MacLion comes with a complete programming language to let you manipulate records to your heart's content, but you will hardly

We wanted Michael Wilson to tell you how much time he saves with MailManager.

But he went home early.

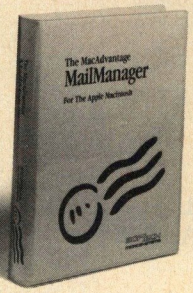
MailManager was designed to speed things up for anyone who generates lots of labels, lists and letters. That's why Mike's out the door early so often.

MailManager teams up with MacWrite or Microsoft Word to turn your 128K or 512K Mac into a powerful database manager and form letter generator.

If you use a Macintosh, you already know how to use MailManager. Only MailManager does all this—and does it very fast—for just $119:

Prints without pausing after each record (that's what slows down other merge/sort programs) • Re-formats form letters automatically when merging information from your database • Integrates MacPaint artwork into form letters • Lets you define up to 72 criteria per database • Immediately retrieves records you need based on any or all of these 72 criteria at the click of Mac's mouse • Manages as many records as you can store on a 3.5-inch or hard disk • Needs no special printer interfaces to produce letter-quality or dot matrix hard copy.

Ready to spend less time managing your data? Call toll-free. And let us bring you up to speed. Call Customer Sales toll-free for the location of your nearest MailManager dealer: 800-451-8080 In California, 800-824-7867



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CIRCLE 177 ON READER SERVICE CARD

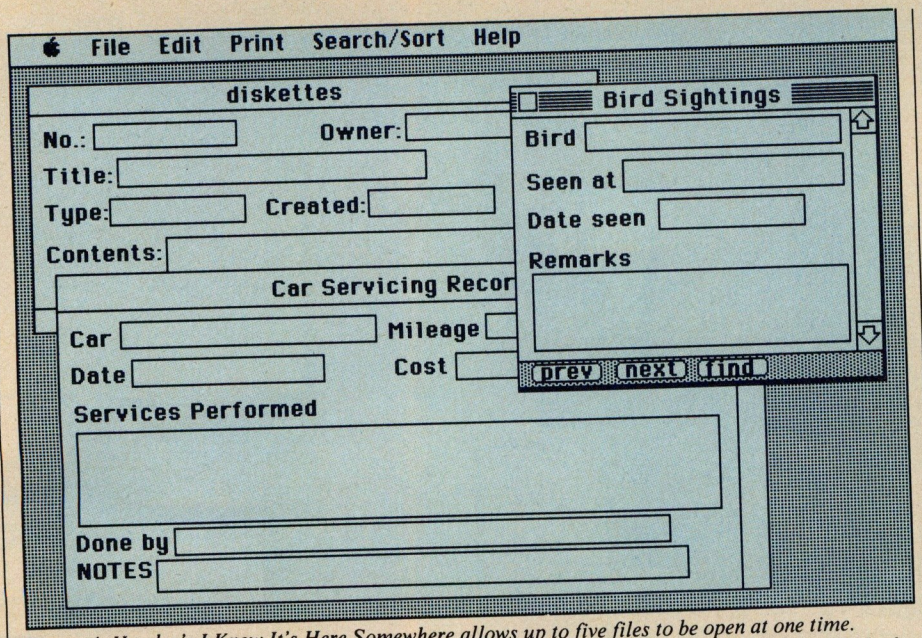

Figure 4: Hayden's I Know It's Here Somewhere allows up to five files to be open at one time. Although it is not a powerful program, its ease of use and perfect performance make it just right for small, personal file needs.

know that you're working on a Mac.

Main Street Filer is mediocre at best and easily wins the "worst documentation" award.

MegaFiler is especially good for mailing labels, and it has the advantage of being compatible with other Mac applications from Megahaus.

Microsoft File is an all-around winner. The program is made more attractive by the fact that Word has a "conditional language" that can print special forms based on File's records (see figure 2).

Omnis 2 doesn't offer much in the way of output quality or variety, and it certainly doesn't look as if it were made for the Macintosh. It is upwardly compatible with the relational Omnis 3, however. Although it was not available for review, Omnis 3 should be available by the time this article is published, so I have included it in the charts.

OverVUE is an excellent program that needs improvement in its output options (see figure 1). An update, due out about the same time as this article, will offer a number of new features, including relational capabilities, keyboard macros (a way to chain often-used commands together), and charting and graphing abilities.

PFS:File is plain and not very powerful. It works easily and smoothly, but you might as well be working on another computer. (It is usually packaged with PFS:Report—the report features in the Additional Features chart (see page 111) refer to PFS:Report's abilities). ✚

Sharon Aker is a free-lance journalist specializing in Macintosh applications. Her books include the recent MacPack *from Ashton-Tate and the forthcoming* Microsoft BASIC on the Mac *from Scott, Foresman.*

ExperLogo *for the Macintosh*™ is a powerful extension of the Logo computer language. ExperLogo excels as the patient tutor for those being introduced to computers for the first time, while at the same time it serves as a powerful development tool for the skilled programmer.

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DB Master
Stoneware, Inc.
50 Belvedere Street
San Rafael, CA 94901
(415) 454-6500
List Price: $195
CIRCLE 358 ON READER SERVICE CARD

Filevision
Telos Software Products
3420 Ocean Park Blvd.
Santa Monica, CA 90405
(800) 554-2469
(800) 368-3813 in CA
List Price: $195
CIRCLE 397 ON READER SERVICE CARD

1st Base
DeskTop Software Corporation
228 Alexander Street
Princeton, NJ 08540
(609) 924-7111
List Price: $195
CIRCLE 359 ON READER SERVICE CARD

Helix
Odesta
3186 Doolittle Drive
Northbrook, IL 60062
(800) 323-5423
(312) 498-5615 in IL
List Price: $395
CIRCLE 398 ON READER SERVICE CARD

I Know It's Here Somewhere
Hayden Software
600 Suffolk Street
Lowell, MA 01854
(800) 343-1218
List Price: $59.95
CIRCLE 360 ON READER SERVICE CARD

Main Street Filer
Main Street Software
1 Harbor Drive
Sausalito, CA 94965
(800) 824-8757
List Price: $199
CIRCLE 362 ON READER SERVICE CARD

Microsoft File
Microsoft Corporation
10700 Northup Way
Box 97200
Bellevue, WA 98009
(206) 828-8080
List Price: $195
CIRCLE 364 ON READER SERVICE CARD

Omnis 2 and Omnis 3
Organizational Software Corp.
2655 Campus Drive, Suite 150
San Mateo, CA 94403
(415) 571-0222
List Price: Omnis 2, $275; Omnis 3, $375
CIRCLE 365 ON READER SERVICE CARD

MacLion
Computer Software Design
1911 Wright Circle
Anaheim, CA 92806
(714) 634-9012
List Price: $379
CIRCLE 361 ON READER SERVICE CARD

MegaFiler
Megahaus Corporation
5703 Oberlin Drive
San Diego, CA 92121
(619) 450-1230
List Price: $195
CIRCLE 363 ON READER SERVICE CARD

OverVUE
ProVUE Development Corp.
222–22nd Street
Huntington Beach, CA 92648
(714) 969-2431
List Price: $295
CIRCLE 366 ON READER SERVICE CARD

PFS:File and PFS:Report
Software Publishing Corporation
1901 Landings Drive
Mountain View, CA 94043
List Price: $125 each, $195 for both
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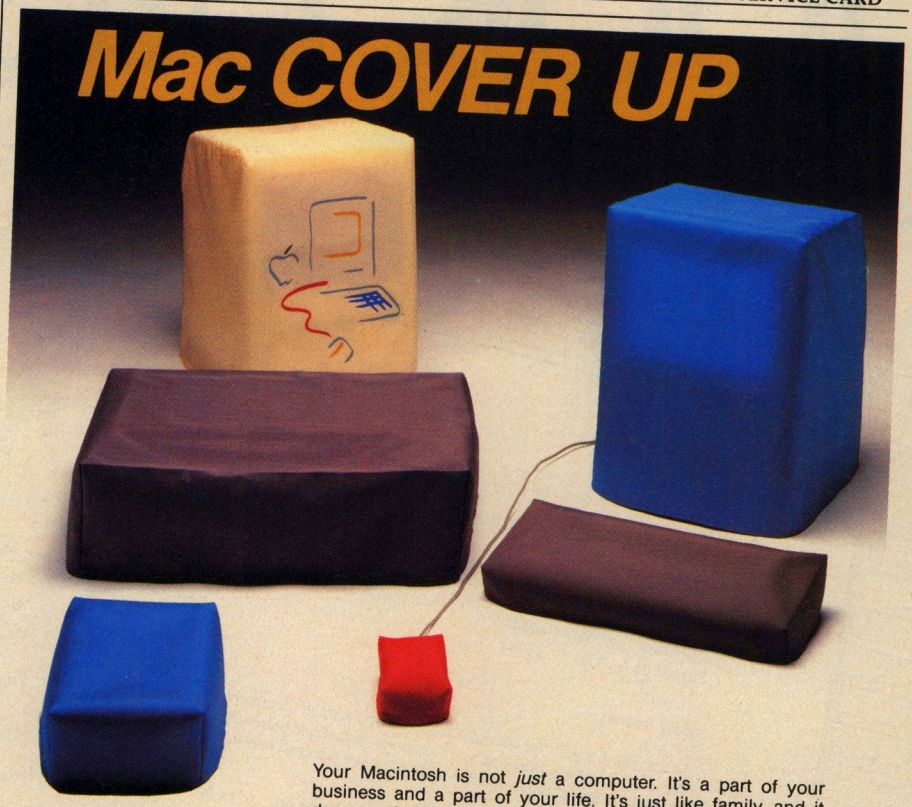

Your Macintosh is not *just* a computer. It's a part of your business and a part of your life. It's just like family, and it deserves the *best* of care. So put on a ***'COVER UP'*** and see how great your Mac will look while being protected from dust and spilled liquids. ***'COVER UPs'*** are custom designed to fit like a glove, and yet allow very easy access to your Mac. With our ***'COVER UPs'***, you can arrange your hardware any way you like. An individual ***'COVER UP'*** is available for each component in your system. So after a long day with Mac, you won't have to rearrange your hardware when you shut down. Just ***'COVER UP'***. *Save time, and save your Mac,* in one of seven beautiful colors, from tan to blue to bone (same as the color of the Macintosh).

Set #	Contents	Sug. Retail*
MACINTOSH SETS		
#M1	Macintosh, KYBD, Mouse, Imagewriter	$29.95
#M2	Macintosh, KYBD, Mouse, Imagewriter, and Ext. Disk Drive	$31.95
#M4	Macintosh, KYBD, Mouse, Imagewriter, Ext. Disk Drive, and Numeric Ten Key	$32.95
MACINTOSH XL SETS		
#L1	Macintosh XL with Profile Piggyback	$25.95
#L2	Macintosh XL 2/5, 2/10	$23.95

Set #	Contents	Sug. Retail*
APPLE IIc SETS		
#C1	Apple IIc KYBD and Monitor	$18.95
#C2	Apple IIc KYBD, Monitor, and Ext. Disk Drive	$24.95
APPLE IIe SET		
#E1	Apple IIe KYBD, Monitor, and Ext. Disk Drive	$25.95
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NEW PRODUCT Now you can take it with you, your diskettes that is. New 'SOFT PAK' makes it possible. Attractive pocket size (3½") diskette carriers. Two sizes available now. 4 or 6 Pak.

CIRCLE 163 ON READER SERVICE CARD

Now data do look base.

The Spokesman

PRICE LIS

Effective January, 1985

Number	Product Description	Price
5	Water Bottle	15.00
	Ladies 26" Breeze 10 Speed	179.00
	Bicycle Built For Two	249.00
00		69.00
100		
27M		
T100		
FCA911		
FCA901		
5792		
5796		
5650		
BBS200		
BBA101		
BBA102		
27AW		
26AW		
SB 231		

The Spokesman

STOCK BOOK

Description Handlebar Tape

Number HT100

Opening Stock 20	Closing Stock 10
Last Inventory Date January 10, 1985	Current Inventory Date March 31, 1985
Reorder Point 8	Understocked by -2
Vendor MiracleTape Inc.	
Vendor Address 66 Tacky Drive Stickyville, MA 01701	Comments Available in brown, red

To: Acme Water Bottle Sales
2389 E. Salem Drive
Kiokuck, Iowa 23668

To: American Bicycle
234 Main Street
Philadelphia, PA 03456

To: MiracleTape Inc.

The Spokesman

Vendor	Description	Item Number	Closing Stock	Under-Stocked
Acme Water Bottle	Water Bottle	AC 2345	8	4
Totals for Acme Water Bottle Sales		Unique items 1	Units in Stock 8	Reorder units 4
American Bicycle	Ladies 26" Breeze	AB26L	3	-1
American Bicycle	Bicycle Built For Two	AB200	4	8
American Bicycle	Solo Unicycle	AB100	5	1
American Bicycle	Mens 27" Blazer	AB27M	3	1
Totals for American Bicycle		Unique items 4	Units in Stock 15	Reorder units 9
MiracleTape Inc.	Handlebar Tape	HT100	10	-2
Totals for MiracleTape Inc.		Unique items 1	Units in Stock 10	Reorder units -2
Miyaka Bicycle	Chrome forks for 27"	FCA911	2	1
Miyaka Bicycle	Red Flyer Bike	FCA901	4	1
Totals for Miyaka Bicycle		Unique items 2	Units in Stock 6	Reorder units 2
		2	1	
		5	3	
		3	3	
		Units in Stock 10	Reorder units 7	
		Units in Stock 49	Reorder units 20	

$0.50	$5.95	
$1.00	$78.85	
$5.45		Total R
$10.90		
	$15.95	$8
	$1.75	$15
	$14.65	$5.
		$43.5
		Total Restock Cost $65.15
		Total Restock Cost $1,330.81

The Spokesman

12 Bearing Street Wheeling, W.VA 26055

March 6, 1985

Jeremy Williamson, Jr.
1456 East Raybourne Road
Farmville VA 23944

Dear Jeremy:

Thank you for your recent order from the Spokesman Company. We are currently processing your order for immediate shipment. The following list represents the totals we have received in our shipping department.

2	27" alloy wheel	# 27AW	at	$62.00	$124.00
1	Seat Post	# 5792	at	$22.78	$22.78
4	Brake Shoes	# BBS200	at	$3.00	$12.00
2	Saddle Bags	# SB 231	at	$38.00	$76.00

Total Order: $234.78

I am confident
products for yo
free number if
modify the or
telephone prio
adequate noti

Thank you a
again in the

Sincerely,

John L. Sp

The Spokesman

PURCHASE ORDER

To: Weinmann, USA
88 Skid Row
New York, NY, 01103

Description	Item Number	Units	Unit Price	Extended Price
Brake shoes	BBS200	2	$0.50	$1.00
Brake lever, right front tire	BBA101	1	$5.45	$5.45
Brake lever, left front	BBA102	2	$5.45	$10.90

Amount of Purchase order:	$17.35
Sales Tax:	$1.12
Total Amount of Purchase order:	$18.47

esn't have to

Introducing FileMaker.

Because just *having* information isn't enough. You have to be able to do whatever you want with it. Arrange it. Rearrange it. Massage it. Embellish it. Make it into something you can use. Easily.

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First of all, FileMaker lets you change direction, any time, without redoing everything. It even lets you start out without a direction.

And in addition to doing all the meat-and-potatoes things a database is supposed to do—calculations, summary reports, sorting of all kinds—FileMaker does everything you bought your Macintosh™ for. Text editing. Graphics. Pull-down menus. Keyboard commands. Windows. Different fonts, styles and graphic design tools. Your information not only makes more sense, it makes an impression. Any kind you want.

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Because you design your output right on the screen, you can see exactly what you (and your customers) are going to get. And you can create any number of forms for your information to take.

So what might have been a dreary order acknowledgement can now be a clear, friendly letter. Or it can be a meaningful comparison of inventory by vendor. Or parts lists, receiving verifications, purchase orders, labels, name badges, rosters and hit lists.

With FileMaker, you can pick up from other programs, like MacWrite,™ MacPaint,™ MicroSoft Plan,™ Jazz,™ and share the applications you've created with other members of your team. You get all the tools you need to easily consolidate group efforts into one database.

And FileMaker takes full advantage of the Macintosh family, including the Macintosh XL,™ Macintosh Office™ and LaserWriter.™

So for $195 (suggested retail), things could look considerably better for your entire division, department, professional practice, retail operation, club, organization, or principality.

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Front Desk

A perfect match for the Macintosh

A calendar and time-accounting package for the person who schedules appointments, coordinates personnel, and calculates billing

Front Desk, from Layered, Inc., is a new kind of office-management tool designed to track your most valuable commodity—people. Because it manages time and services for as many as 15 people, places, or things, it is ideal for anyone who schedules appointments or coordinates personnel.

Monthly Calendar

Front Desk's central feature is a full-screen monthly calendar that displays the current month, as set on the Macintosh's internal calendar (see figure 1). The current day is highlighted, and check marks indicate past days. By clicking on the months at the right of the screen, you can move forward or backward through the year to locate a specific date.

Clicking to the left of any week on Front Desk's monthly calendar changes the display to a graphic representation of that particular week (see figure 2). Each appointment scheduled during the week appears as a shaded block. This design makes it easy to see at a glance when openings are available and when the work load is at its heaviest.

Because you can view the same schedule in a variety of ways, Front Desk makes it possible to do some tasks that would be very difficult with conventional scheduling systems. For example, a client needs an appointment but has only Wednesdays free. With Front Desk, you can easily bring the next few Wednesdays into view and locate an opening. You can view a "month of Sundays," if need be!

One Day at a Time

Double-clicking on a particular day brings a schedule of that day into view, and you can see a day's worth of appointments in various ways. Since Front Desk manages time for several people, one option is to view the schedule for all staff members. This schedule shows the activities slated for each member of the team, but does not allow for very detailed information.

Arranging the display so that it shows only one "resource"—as Front Desk calls staff members—gives a much more informative picture (see figure 3). Here, on each single line, are the name of each person with an appointment, the person's telephone number, the type of appointment, the fee, and the status of the appointment. Scroll bars at the right of the screen move the listing to a later or earlier time in the day, and scroll bars at the bottom of the screen let you jump forward or backward one or more days at a time.

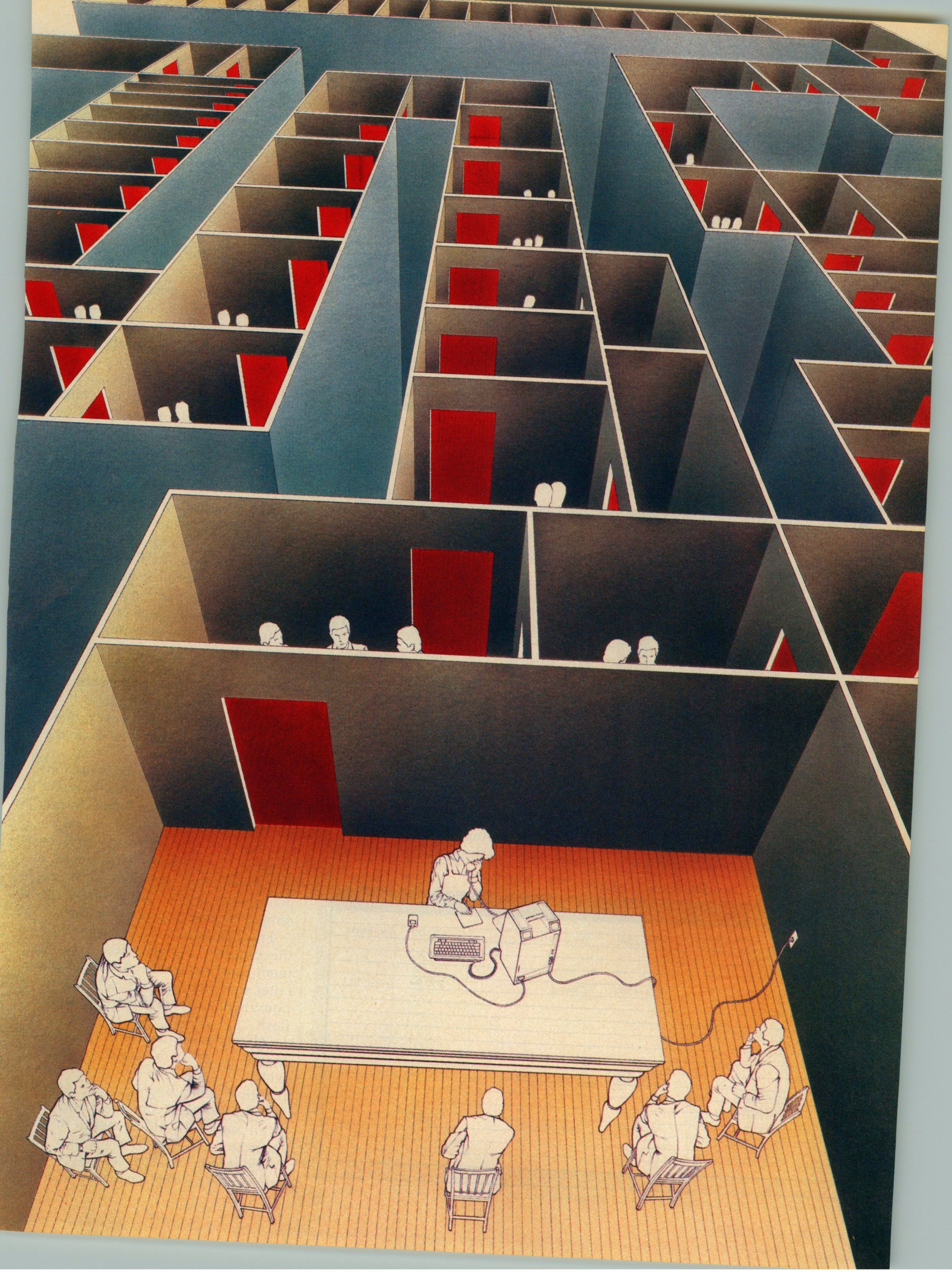
Appointment-Entry Form

If you need more detailed information, double-clicking on a time block brings an appointment-entry form into view (see figure 4). The form shows a detailed breakdown of an appointment and includes starting and ending time, expected revenue, and even a section for comments and notes.

You use this same form to enter new appointments. Simply double-click on an empty time slot, and a blank form appears. Fill in the required information, and Front Desk automatically reserves the time and calculates expected revenue based on the services to be performed. Enter appointments that are longer than standard length by selecting several adjacent time slots at the same time.

A Service menu holds a choice of professional services that your company offers. In a law firm, this menu could include Consultation, Closing, Will Preparation, Incorporation, and other legal services. If you were using the program in a dental office, you would list Cleaning, X ray, Filling, and Extrac-

KEVIN O'SHEA



File Edit Actions Arranged By Service Status

March 1985

For All Attorneys

© Layered, Inc. 1984

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Wk 1						✓ 1	✓ 2 Closed
Wk 2	✓ 3 Closed	✓ 4	✓ 5	✓ 6	✓ 7	✓ 8	✓ 9 Closed
Wk 3	✓ 10 Closed	✓ 11	12	13	14	15	16 Closed
Wk 4	17 Closed	18	19	20	21	22	23 Closed
Wk 5	Cl 24 / Cl 31	25	26	27	28	29	30 Closed

JAN 86 FEB 85 MAR 85 APR 85 MAY 85 JUN 85 JUL 85 AUG 85 SEP 85 OCT 85 NOV 85 DEC 85

Figure 1: Front Desk's full-screen monthly calendar

File Edit Actions Arranged By Service Status

June 1985

Time	Monday 6/3					Tuesday 6/4					Wednesday 6/5					Thursday 6/6					Friday 6/7				
	LB	EL	BS	RD	PC	LB	EL	BS	RD	PC	LB	EL	BS	RD	PC	LB	EL	BS	RD	PC	LB	EL	BS	RD	PC
800A	■		■	■				■			■	■		■		■		■			■	■			
830A	■		■	■		■		■	■	■	■	■	■	■		■		■			■	■			■
900A	■	■	■				■	■	■	■	■	■	■	■				■	■		■			■	■
930A	■	■	■		■		■		■		■		■	■		■		■			■		■	■	■
1000A	■			■	■	■			■		■		■	■		■		■			■		■		■
1030A	■			■			■		■		■	■		■		■		■			■		■		■
1100A	■			■	■			■				■	■			■		■	■		■		■		■
1130A	■		■	■	■	■		■		■	■		■						■		■	■			■
1200P		■			■	■	■			■	■			■	■		■		■			■			
1230P		■	■	■	■		■	■		■	■		■		■	■	■		■		■				■
100P	■		■	■	■		■			■	■		■		■	■	■		■		■			■	
130P	■		■	■					■		■				■				■		■	■			■
200P	■	■		■	■				■		■	■			■	■		■			■	■	■	■	■
230P	■	■		■	■				■		■	■		■				■				■		■	
300P	■	■		■	■				■		■	■				■		■	■		■	■		■	
330P	■	■	■	■	■		■		■		■						■	■	■		■	■			
400P	■	■				■	■				■	■				■	■	■	■			■			
430P	■				■	■													■						
500P	■					■						■							■						
530P		■																							

Figure 2: A display of a week's appointments for five staff members

File Edit Actions Arranged By Service Status

Eric Levine

Wednesday, June 5th 1985

Time	Name	Telephone	Service	Amount	Status
800A					
830A	Kawasaki, Guy	353-2098	Consultation	100.00	Confirmed
900A	-Continued				
930A					
1000A					
1030A	Oguejiofor, Ed	984-4500	Closing	250.00	Confirmed
1100A	-Continued				
1130A					
1200P					
1230P					
100P					
130P					
200P	Ed	234-0655	Estate Planning	150.00	Call
230P	-Continued				
300P	-Continued				
330P					
400P	SVB	234-0655	Consultation	150.00	Call
430P	-Continued				
500P	-Continued				
530P					

Figure 3: Front Desk can also show the appointments for one day, for each staff member.

tion in the Service menu.

Simply select the service while the Appointment-Entry form is on the screen, and it is entered into the form automatically. Adding or removing a menu item is an easy task and can be done anytime.

Each service on the menu carries with it a billing status as well. If the service is billed on an hourly basis, Front Desk calculates the charge automatically by multiplying the hourly rate by the length of the appointment. Flat-rate items are billed at one price, regardless of the appointment length. You can alter both hourly and flat-rate charges as necessary. A final option lets you assign nonbillable status to services you offer at no charge, such as initial consultations and sales calls.

Tracking Services and Revenues

Front Desk's design enables you to customize the program to your exact business schedule. In the Calendar Setup mode, you tailor the program by selecting your opening and closing hours, marking any days of the week you are closed, and selecting a standard length for each appointment.

True to its name, Front Desk works best at the front desk of a professional office. You can get information from the program quickly and easily, making it ideal to use while you're on the telephone.

A common problem in professional practices occurs when clients make appointments and then forget the day and/or time. A phone call to the office requires the secretary to look through the appointment book, a time-consuming activity, since appointment books are usually arranged by time and not by name.

Front Desk has an easy solution to this problem. Simply select Appointment Search from the Actions menu, enter the client's name, and the appointment is brought to screen in a flash.

All of the appointments in a given month reside in a historical record, which stores one to three prior months, depending on your needs. When a month is completed, the program purges the oldest month in this record to make room for the new addition. Front Desk pauses before this transaction takes place to let you back

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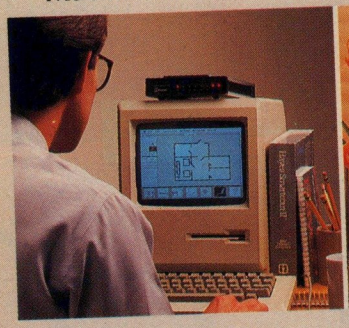
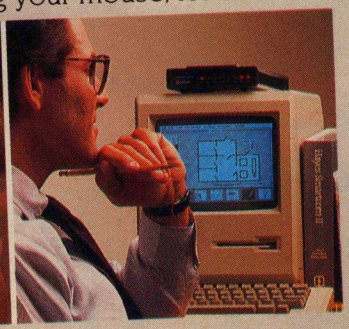


Atlanta, 3 P.M. "Here's the plan for the new space. What do you think?"

Boston, 3:04 P.M. "Looks good. But can you move the lounge over here, and add a second exit, like this?"



Atlanta, 3:05 P.M. "Brilliant! I'll incorporate these changes for tomorrow's meeting."

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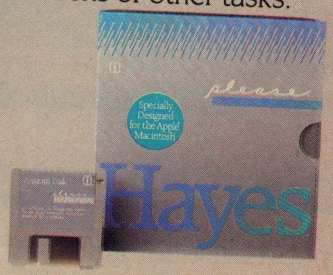

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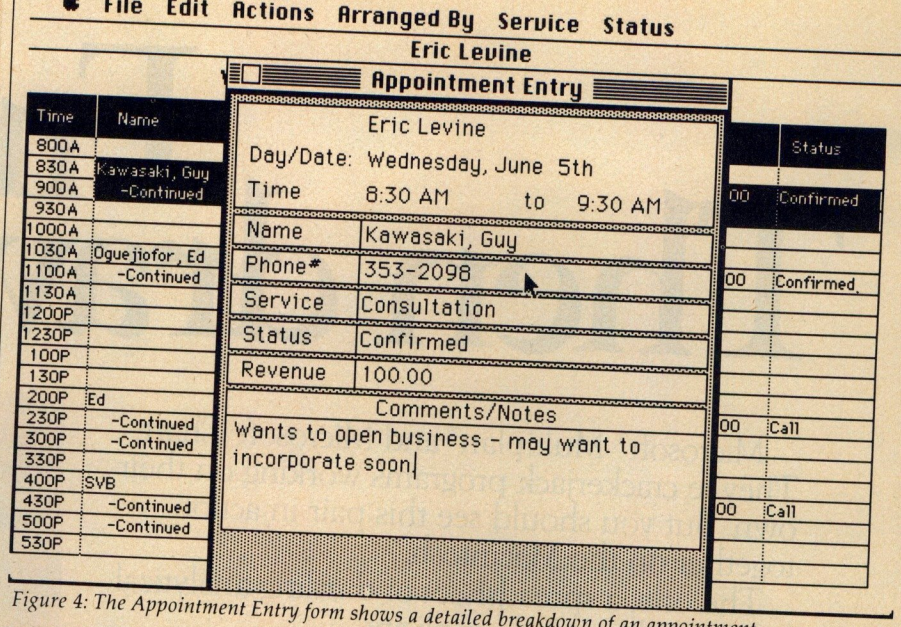

Figure 4: The Appointment Entry form shows a detailed breakdown of an appointment.

Cambridge Legal Asso -- Work Hours Report.
For The Period : June, 1st To June, 30th 1985.

All Attorneys:

Services:	Rate Fee	LB 95.00	EL 100.00	SB 125.00	DD 95.00	Total Hours	% by Service
Consultation	.00	28.5	10.5	7.5	15.0	61.5	25.8
Contract	250.00	10.0	4.5	3.5	3.0	21.0	8.8
Negotiation	.00	3.5	.0	3.5	3.0	10.0	4.2
Title Search	125.00	12.0	.0	.0	.0	12.0	5.0
Closing	250.00	5.0	4.0	2.0	.0	11.0	4.6
Purchase & Sale	200.00	5.0	3.0	4.5	1.5	14.0	5.8
Estate Planning	.00	8.0	7.0	7.0	.0	22.0	9.2
Estate Settlement	.00	3.0	.0	2.0	.0	5.0	2.1
Incorporation	.00	.0	.0	.0	.0	.0	.0
Administration	.00	.0	.0	.0	.0	.0	.0
Personal	.00	.0	.0	3.0	.5	3.5	1.4
Undefined Service		2.5	8.5	41.5	25.0	77.5	32.6
Total Hours		77.5	37.5	74.5	48.0	237.5	100.0
% Of Total by Attorneys		32.6	15.7	31.3	20.2	100.0	

Figure 5: The Work Hours Report shows the type of appointments during a month.

up the older records and put them into your permanent archives.

Front Desk produces many useful reports. One of these, the Appointment Confirmation Report, lists all the appointments scheduled for a given day or week and whether the individual appointments need final confirmation.

Selecting Appointment Analysis from the Actions menu produces two other reports—the Work Hours Report and the Revenues Report. The former shows the type of appointments each member of your staff has scheduled for the month. The Work Hours Report also compares the work load of staff members (see figure 5).

The Revenues Report gives a breakdown of a company's revenue sources, showing how much of your income is coming from each service. The same report shows how the income breaks down by staff member, and it also gives the average hourly income derived from each service (see figure 6).

Reports can reflect activity for a day or for a complete month, and for one or all of the staff members listed on a Work Hours Report or Revenues Report. Standard Macintosh print-formatting commands are available in the Report mode, allowing you full control over the final output.

Quality of the First Order

Like all well-designed Mac software, Front Desk uses scroll bars, dialog boxes, and pull-down menus throughout. If you are comfortable

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Then draw your

Microsoft® Multiplan® and Microsoft Chart. They're crackerjack programs working on their own. But you should see this pair in action together on the Macintosh.™

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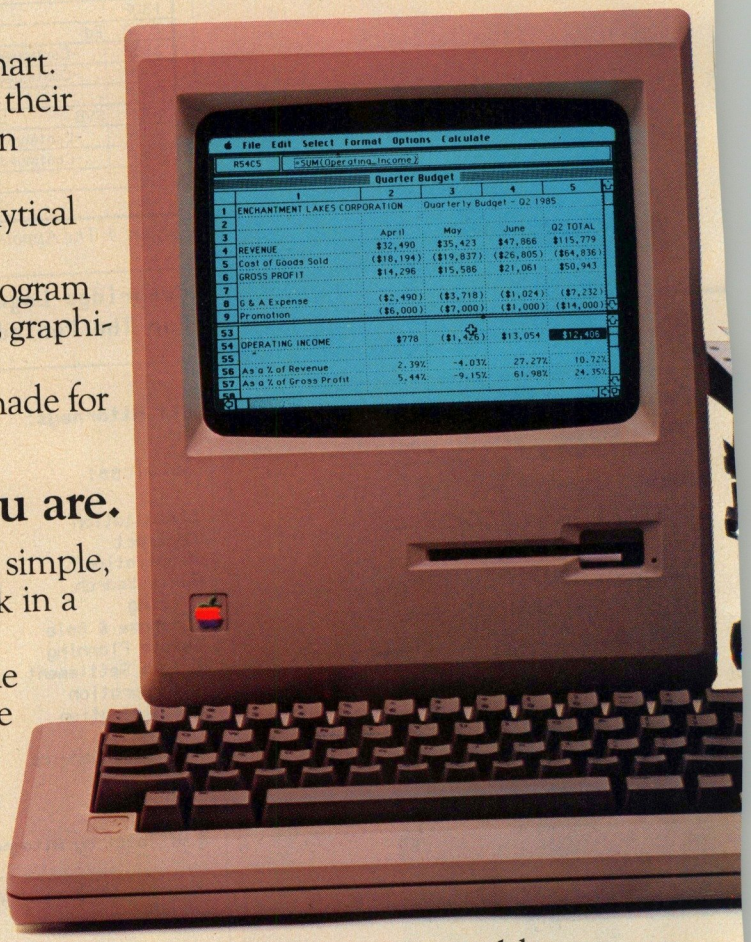

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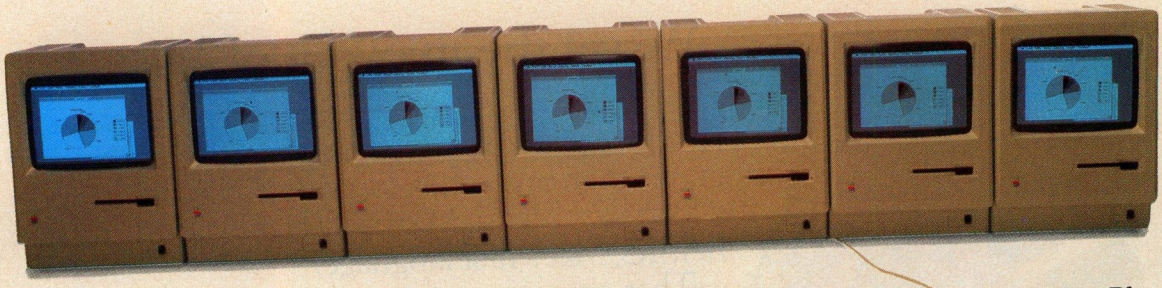

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Cambridge Legal Asso -- Revenues Report.
For The Period : June, 1st To June, 30th 1985.

All Attorneys:		LB	EL	Total	% by	Total	Avg.
	Rate	95.00	100.00	Revenue	Service	Hours	$/Hr.
Services:	Fee						
Consultation	.00	2707.50	1050.00	3757.50	23.9	39.0	96.34
Contract	250.00	3000.00	750.00	3750.00	23.9	14.5	258.62
Negotiation	.00	332.50	.00	332.50	2.1	3.5	95.00
Title Search	125.00	2000.00	.00	2000.00	12.7	12.0	166.66
Closing	250.00	1500.00	1000.00	2500.00	15.9	9.0	277.77
Purchase & Sale	200.00	1200.00	400.00	1600.00	10.2	8.0	200.00
Estate Planning	.00	760.00	700.00	1460.00	9.3	15.0	97.33
Estate Settlement	.00	285.00	.00	285.00	1.8	3.0	95.00
Incorporation	.00	.00	.00	.00	.0	.0	.00
Administration	.00	.00	.00	.00	.0	.0	.00
Personal	.00	.00	.00	.00	.0	.0	.00
Undefined Service		.00	.00	.00	.0	11.0	.00
Total Revenue		11785.00	3900.00	15685.00	100.0	115.0	136.39
% Of Total by Attorneys		75.1	24.8	100.0			
Total Hours		77.5	37.5	115.0			
Average Revenue/Hour		152.06	104.00	136.39			

Figure 6: The Revenues Report gives a breakdown of revenue sources.

with Mac software, you will have no trouble operating Front Desk.

Front Desk's operating manual is one of the most complete and informative users' guides I have seen. The manual is superbly produced and illustrated. It covers each command thoroughly and contains a complete glossary and index.

A second, smaller manual shows you how to set up a Front Desk system in a doctor's office, health club, and in many other settings.

Front Desk is copy-protected, but Layered provides a free backup copy for all registered users. Returning the registration card also entitles you to a 90-day warranty and access to free and reduced-price updates.

I am hard-pressed to think of any other Mac-based software package that meets its objectives as smoothly and professionally as Front Desk does. If efficient management of time and resources is an important part of your job, then Front Desk should be at your front desk. ✚

Chuck Doherty is an independent computer consultant and free-lance writer from South Dartmouth, Massachusetts. His work regularly appears in several computer and audio publications.

PRODUCT INFORMATION

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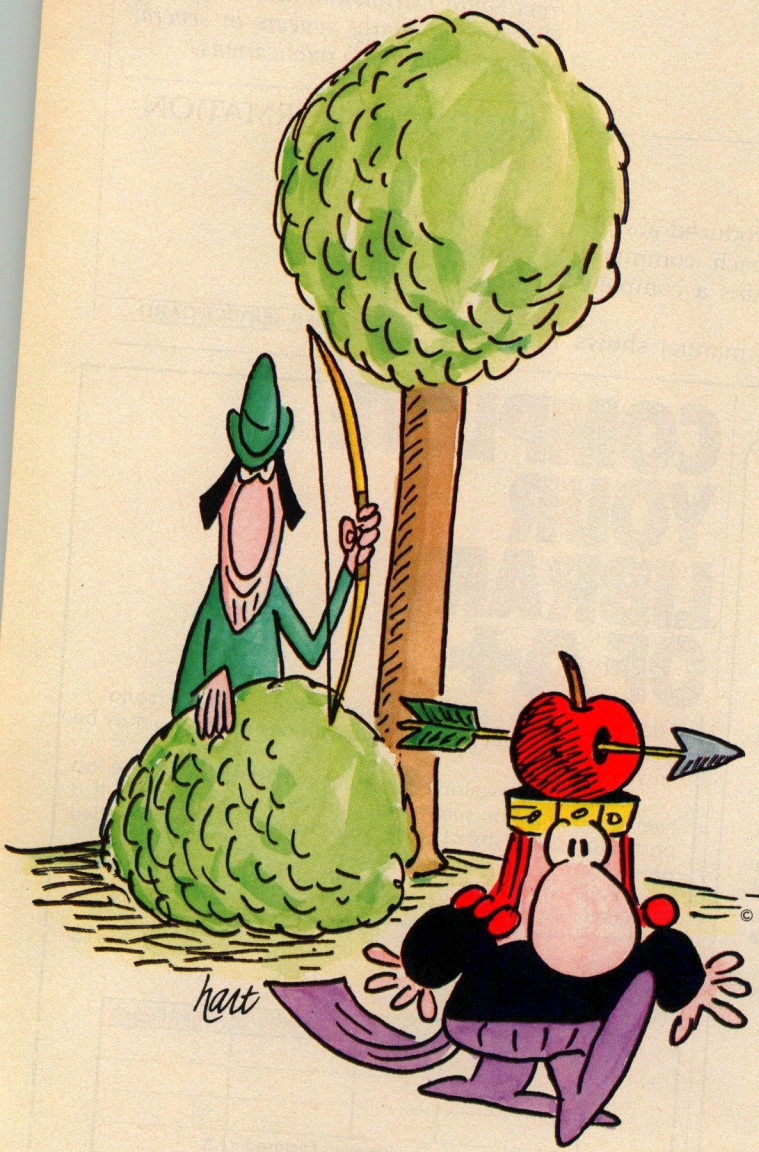

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Printers

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3 Integrated Programs

The Megahaus series of Macintosh software

Data integration is an important part of the Macintosh computer's design that lets it move information from one program into another with relative ease. Although moving graphics from MacPaint into MacWrite documents is fairly simple, some tasks are much more difficult. For example, taking names and addresses from a list and inserting them, one by one, into form letters is possible, but it would be a very tedious job.

Megahaus Corporation produces an integrated family of three programs for the Macintosh that help you use the machine's talents more efficiently. By bridging the gap between different program types, these packages also allow you to do some tasks that were impossible in the past.

MegaMerge adds form-letter capabilities to standard MacWrite documents. To create a form letter, you use MacWrite to prepare the document itself. Every form letter has two parts: a section that is common to all of the letters you will send and the material that will change from letter to letter (such as name, address, and salutation). You distinguish the parts of the letter that are subject to change by using a different font style than that of the rest of the text. Figure 1 shows a typical form letter in which the 14-point Chicago font sets the name, address, city, state, ZIP, salutation, and product apart from the rest of the letter, which is in the standard 12-point Geneva font.

A second file holds the names, addresses, and other information for merging into the letter. This file contains the item names you'll use in the other document, along with the corresponding data for each one (see figure 2, next page). The font of the category names in the letter (called the merge font) matches that of the category names in the data file, so that the program can identify the data it merged into the letter.

You can produce the data file with MacWrite, but even entering two or three names this way is time-consuming, since you must include category names with each entry. MegaMerge can use lists you've generated with MegaFiler, making the task considerably easier.

With floppy-disk drives and an Imagewriter, MegaMerge's printing process is painfully slow—the system spends as much time reading data from the disk as putting it on paper. If you're thinking of using MegaMerge for a large mailing, you had best either set plenty of time aside for printing or consider investing in a hard-disk drive and a LaserWriter, which will speed up the process significantly. With a single 3½-inch floppy-drive system, you'll also have more

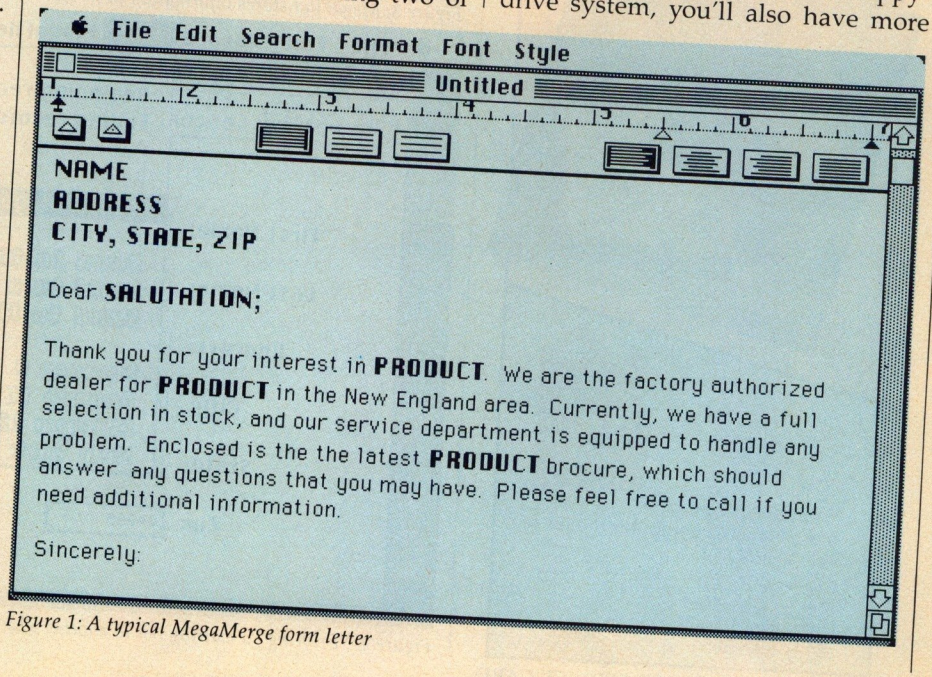

Figure 1: A typical MegaMerge form letter

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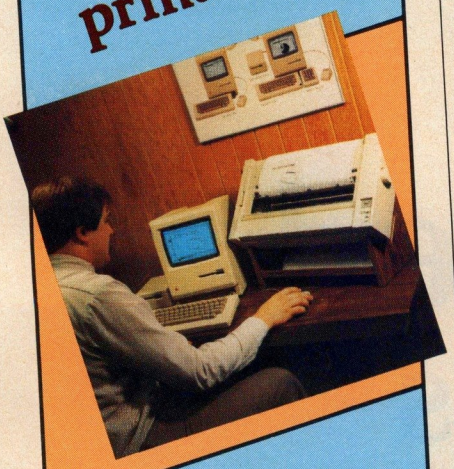

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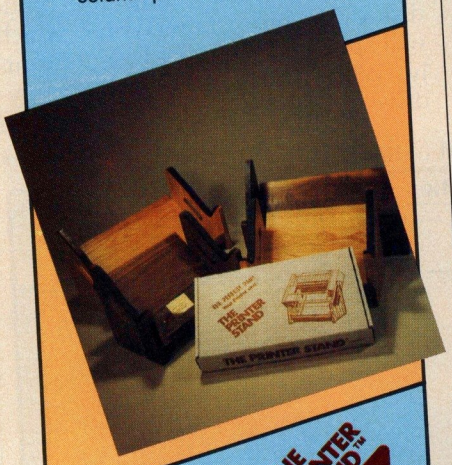

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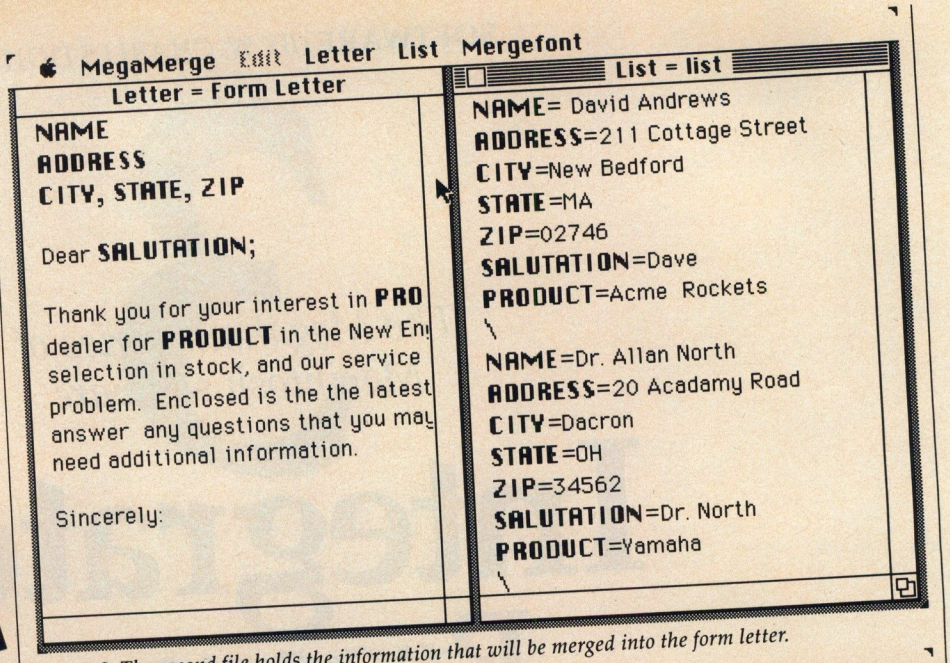

Figure 2: The second file holds the information that will be merged into the form letter.

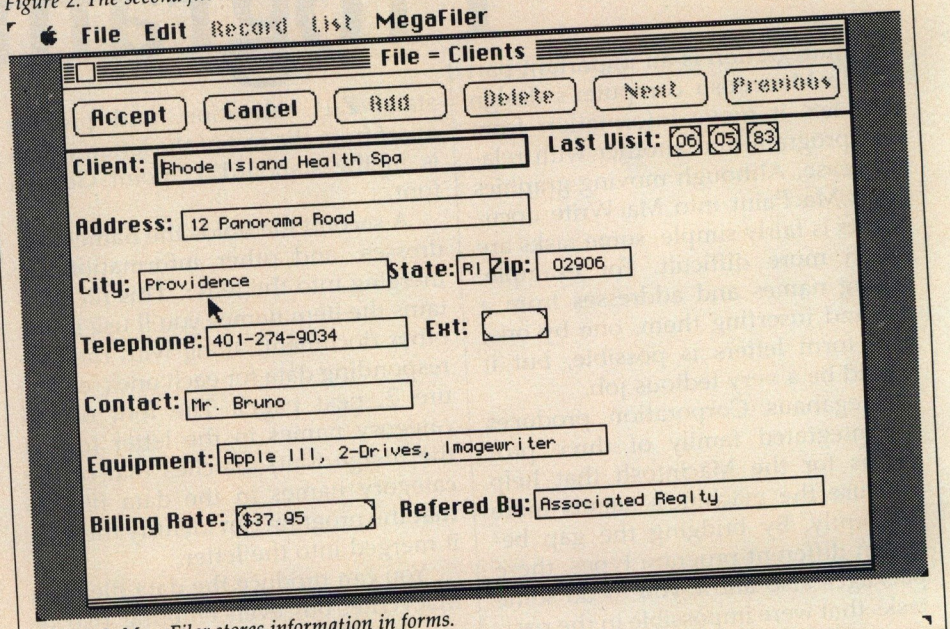

Figure 3: MegaFiler stores information in forms.

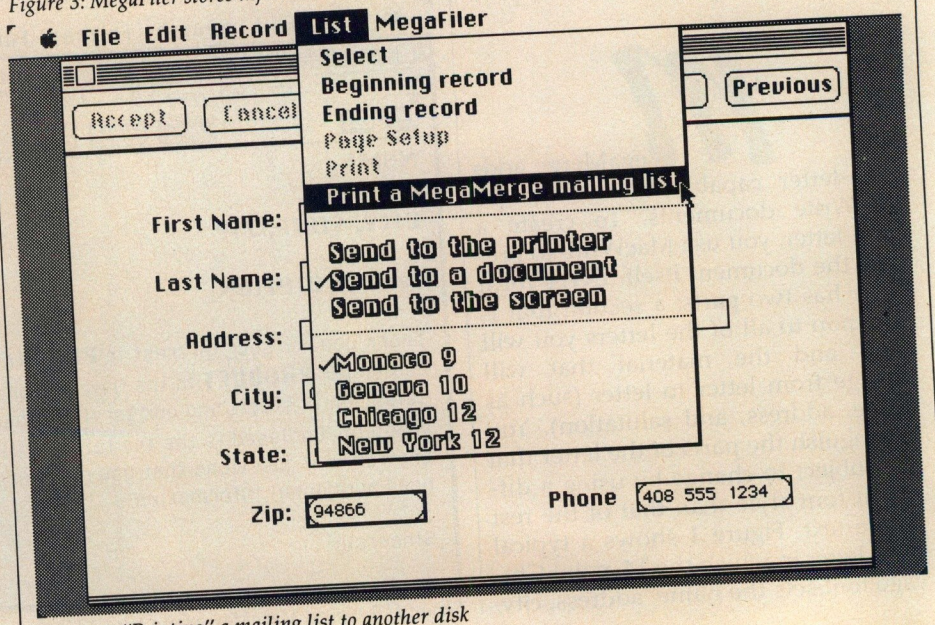

Figure 4: "Printing" a mailing list to another disk

than your share of disk swapping when you prepare the list and document files.

MegaMerge supports chain printing, the printing of several MacWrite documents sequentially as if they were one large piece. This option helps overcome the limit on document length in RAM-based versions of MacWrite (versions 1.0–2.2). To use this feature, you simply create a MacWrite document that lists the names of the documents you want printed, in the order you want them to appear. The process is similar to the one you use with form letters, except that MegaMerge substitutes complete files for each of the filenames you have listed. Another function allows you to merge MacPaint illustrations into MacWrite documents during the printing process or create form letters with the automatic insertion of graphics rather than text.

MegaFiler

MegaFiler is a light-duty system for information storage and retrieval that is easy to use but just as easy to outgrow. Like MegaMerge, MegaFiler can work with a single-drive system, but an external drive makes program use much easier.

You store information in forms (records), in much the same way as you would do manually with index cards (see figure 3). A form can hold up to 60 separate pieces of information (fields) with a maximum total of 1500 characters. Each file allows up to 10,000 records, but the size of each record and the amount of available disk space can limit the file size.

The program uses dialog boxes and pull-down menus throughout. As with most Macintosh software, MegaFiler follows the Mac's conventions, and you can use it efficiently right from the start, with little need to consult the manual.

Once you've selected a data file, you can add new records, browse through those already in the file, or search for entries that match particular criteria. To recall records, you look for a match in any field, but the search is much faster if you presort the file by the appropriate field. For example, a file of customer data, presorted in order of purchase date, would help you locate

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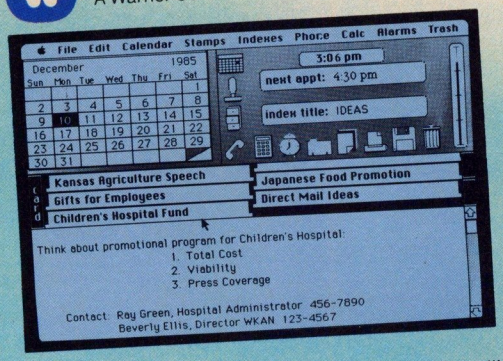

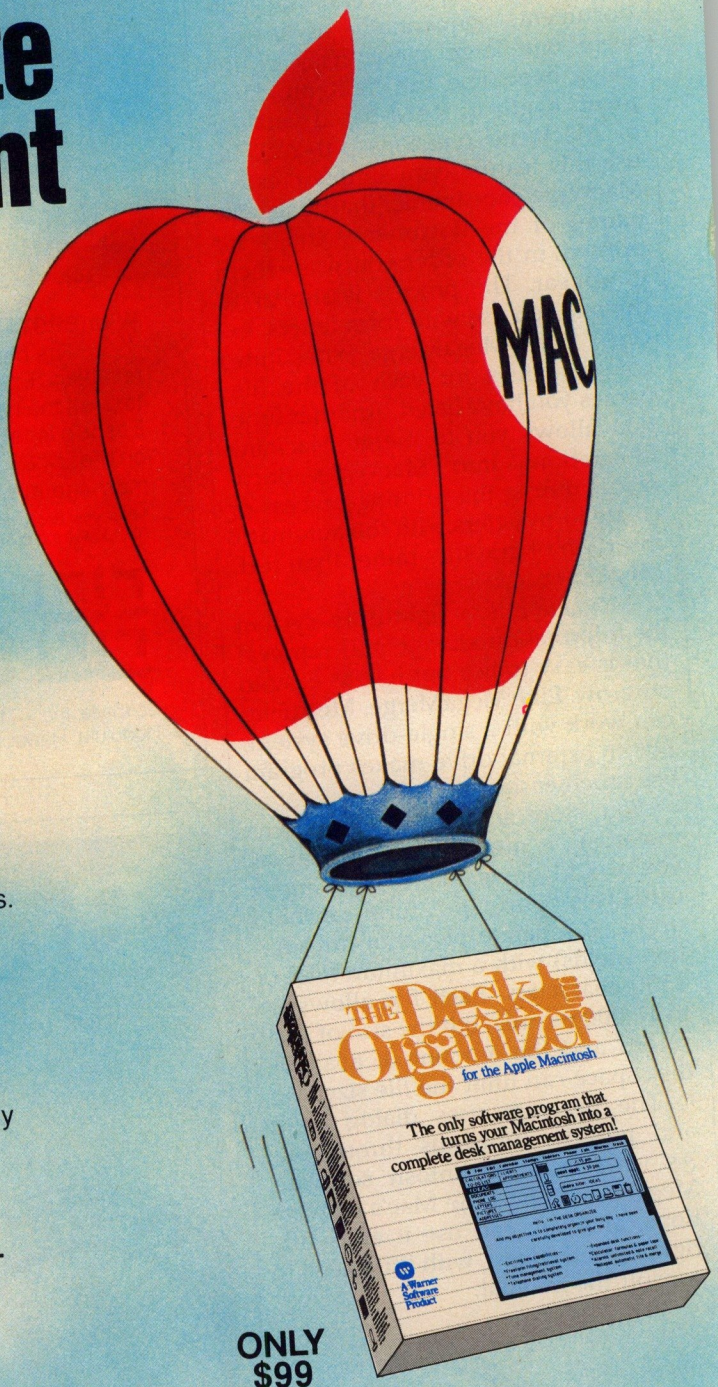

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customer records by date, but it would hold you up if you were searching for a customer by name.

MegaFiler comes complete with several ready-to-use form designs, but creating your own forms is easy. You need only enter the field names you want to use, specify the type of information each field will contain (alphabetic, numeric, or date), and define an area on the form for the data to appear. The entire process is so simple that you can create a new file design in just a few minutes.

Reports for analyzing the data in your files are also easy to design. Two styles are available for the finished list. The label format allows you to print mailing and shipping labels, and the table format organizes the report into rows and columns of data. In the table format, you can also have a summation or count appear at the bottom of the report for numeric analysis.

In both cases, you use the mouse to select which fields you wish to include and position them in the order you wish them to appear, which makes label and report design a snap.

I experimented with several of the sample files, as well as a few files of my own design. In one test, I "printed" a small mailing list to another disk so that MegaMerge could read it and merge the information into form letters (see figure 4). With one disk drive, the process required 18 disk swaps, although the file held only eight names and addresses. With a two-drive system, no swaps are necessary, however.

MegaForm

Megahaus' form-generating program, MegaForm, requires 512K RAM, and a second disk drive is optional but strongly recommended. This program—like the others—is difficult to use on a single-drive machine.

MegaForm is in a class by itself. It lets you create custom forms such as invoices, order forms, or expense sheets and fill them in manually or with data from MegaFiler records. These forms can be as simple or as complex as you need and even include graphics you've created with MacPaint as part of the form design.

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with a set of graphic tools similar to those in MacPaint. They let you create and position boxes, lines, and titles. Once you've finished the design, you assign certain areas of the form for data entry. You can fill the entry—or cells, as MegaForm calls them—with data directly from the keyboard or calculate its value based on information in another part of the form. Thus, you can design forms that automatically calculate figures such as tax, total or discount rate. The commands Megaform uses are similar to those of an electronic-spreadsheet program and are easy to learn.

A cell can "look up" its value from a table located in another part of the form. The data it gets may be a simple value or a reference to yet another table of data. You can make tables or any cells invisible by placing them outside the main form in an area that does not reproduce when you print out the form. Another option provides a sequential "serial" number that you can use to number automatically each form that you fill out.

MegaForm, MegaFiler, and MegaMerge each offer unique features.

MegaForm's ability to cross-reference information contained in cells to MegaFiler data files is the program's most powerful option. For example, an order form may contain a cell, marked "Part Number," with a part number you've entered from the keyboard.

MegaForm can use the number in that cell to locate a MegaFiler record corresponding to that particular item. This record, in turn, may contain information such as the description and price of the item, which can be referenced by another part of the form. One form can access several different data files for information, which, in effect, adds basic "relational" capability to MegaFiler.

Once you've designed a form, you can fill in as many individual copies as you need. Completed forms are stored in a permanent archive file, and you can recall them for examination later. After you put a form into the archive, however, you can't alter the form in any way.

MegaForm's Print option produces hard copy of the form you're currently filling or of another form stored in the archive. Since the entire form—including graphics—prints out, the printing process is slow. Printing the invoice form in figure 5 on an Imagewriter in the standard printing mode took more than four minutes. In the high-quality mode, printing takes even longer. This speed handicap makes MegaForm impractical for producing a large quantity of forms on an Imagewriter. If you anticipate needing many forms, you should definitely consider purchasing a LaserWriter, which will greatly improve this program's performance and output quality. To help speed things up even more, MegaForm allows you to print just the data portion of a form while

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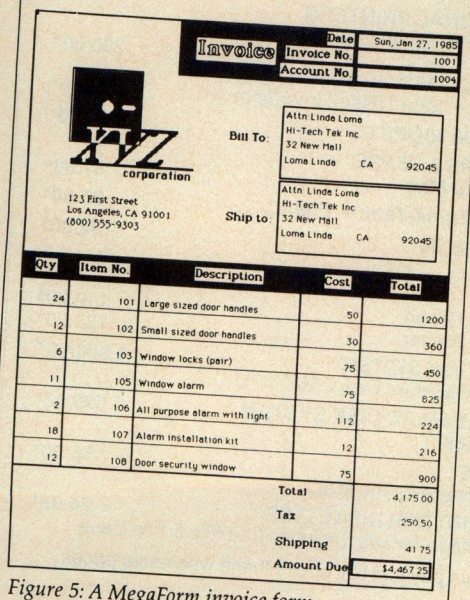
using preprinted forms—rather than blank paper—in your printer.

As interesting as MegaForm may be, it is not the most practical solution to most data-management problems. For example, it lacks a way to analyze or generate reports from the information stored in the archive. Once you've filled a form in, you can print it, but nothing more. Hopefully, Megahaus will address this limitation in a future version.



Invoice

Date	Sun, Jan 27, 1985
Invoice No.	1001
Account No.	1004

XYZ corporation
123 First Street
Los Angeles, CA 91001
(800) 555-9303

Bill To: Attn Linda Loma, Hi-Tech Tek Inc, 32 New Mall, Loma Linda CA 92045

Ship to: Attn Linda Loma, Hi-Tech Tek Inc, 32 New Mall, Loma Linda CA 92045

Qty	Item No.	Description	Cost	Total
24	101	Large sized door handles	50	1200
12	102	Small sized door handles	30	360
6	103	Window locks (pair)	75	450
11	105	Window alarm	75	825
2	106	All purpose alarm with light	112	224
18	107	Alarm installation kit	12	216
12	108	Door security window	75	900
		Total		4,175.00
		Tax		250.50
		Shipping		41.75
		Amount Due		$4,467.25

Figure 5: A MegaForm invoice form

Worth Considering

MegaForm, MegaFiler, and MegaMerge each offer unique features that make them worth considering as additions to your software library. They all come with excellent manuals, and toll-free telephone support is available for all registered users. ✚

Chuck Doherty is an independent computer consultant and free-lance writer from South Dartmouth, Massachusetts. His work regularly appears in several computer and audio publications.

PRODUCT INFORMATION

MegaMerge 2.1, MegaFiler 1.01, MegaForm 1.0
Megahaus Corporation
5703 Oberlin Drive
San Diego, CA 92121
(619) 450-1230

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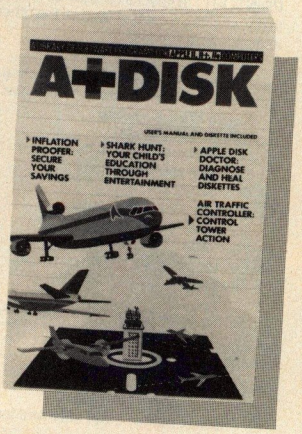

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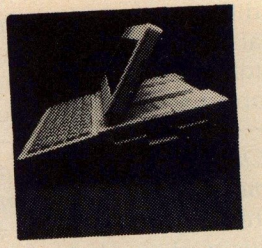

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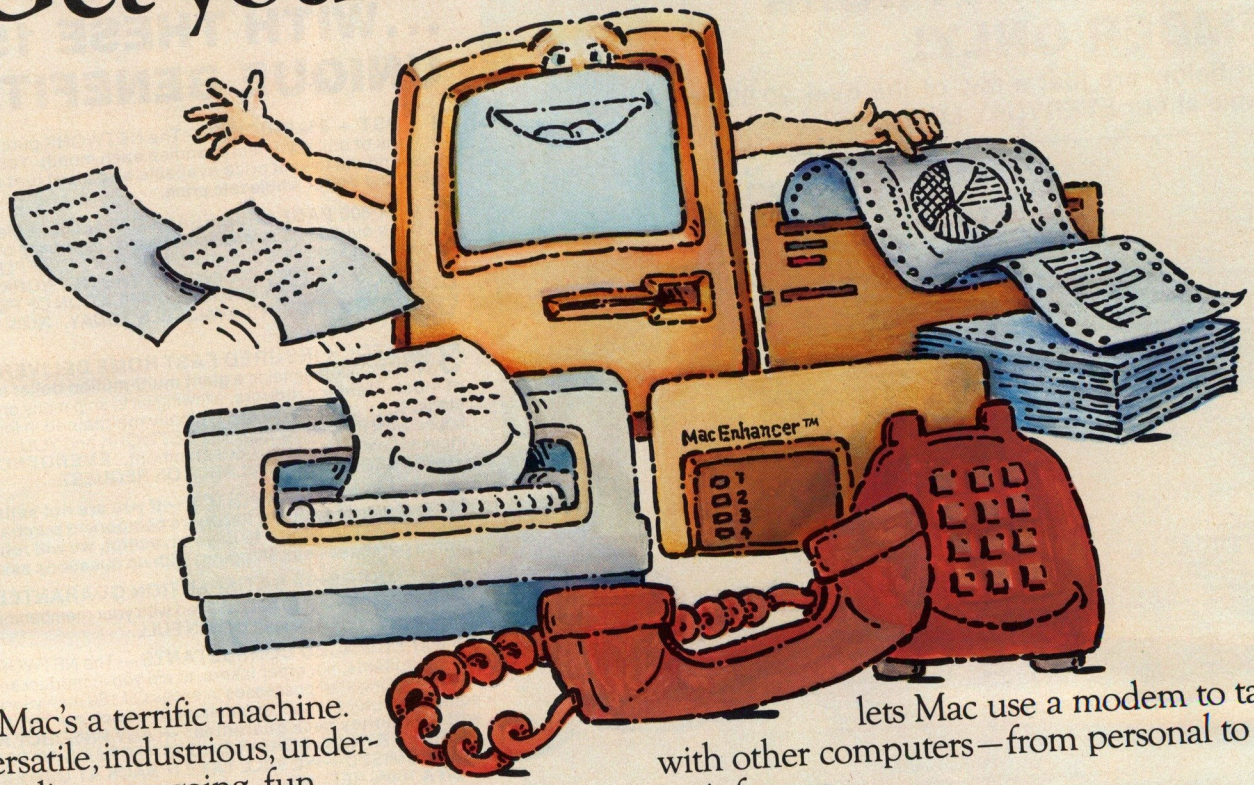

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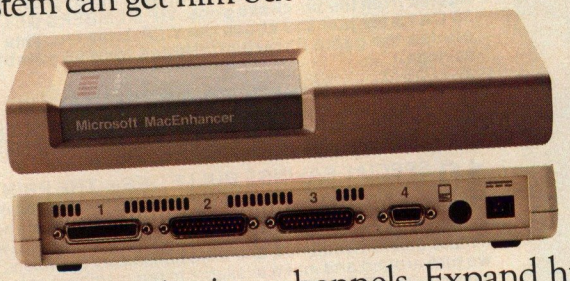

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CIRCLE 175 ON READER SERVICE CARD

A Macintosh Potpourri

Fattening your Mac, FastFinder, MacNosy, TMON, and more

Since summer officially starts this month, perhaps it's time to spend a column doing some late-spring housecleaning.

This month, in no particular order, we'll look at fattening your own Mac, FastFinder (version 1.6) from Tardis Software, and a programming-tool-in-progress: MacNosy (version 1.0). I also have a few comments on previous columns and products I've dealt with. That should clear my shelves of the miscellaneous things I've been wanting to tell you about, so next month we'll jump back into our look at some Mac programming languages.

Fattening Your Own Mac

Well, they said you could do it, and I did—I fattened my own Mac. The original impetus for chopping up my pristine Macintosh motherboard was an article that appeared in the January issue of *Dr. Dobb's Journal* (2464 Embarcadero Way, Palo Alto, CA 94303; back issues cost $3.50 each, which includes shipping). Next came a short article in *68 Micro Journal* that gave an abbreviated version of the Mac-fattening routine.

Then, at the first MacWorld exposition in late February in San Francisco, about half a dozen firms offered various "parts kits" and their own instructions at mouthwatering prices (as low as $225–$350 if you wanted them to do the work). Since I'd enlisted in the microcomputer revolution with a soldering iron in hand (there wasn't any other way), I decided that I had nothing to fear, assuming I still remembered how to solder.

First the warnings: Fattening your own Macintosh will void your warranty, may ruin your motherboard forever (if you slip), will take a good deal of time spent hunched over teeny holes trying to get the solder out of them, and generally is not most folks' idea of fun.

Getting the Mac apart is relatively easy (I bought a set of one-inch-long hex wrenches from Jensen Tools, which work well enough to open the case, but the "proper" tool to get the case open is a Torx screwdriver such as the Xcelite XTD-10). Cutting all 16 RAM chips off the motherboard gave me a bit of a shudder, since at that point, I was committed to making the change. Once you've cut the chips off, you need to desolder (and remove the solder from) 256 locations. It's at this step that I can offer Mac fatteners a few words of advice.

The Macintosh motherboard is a four-layer printed circuit board, which means that some of the traces (connections) run across the two outside surfaces and others run across two surfaces *inside* the board. Pulling the solder from the holes that are connected only on the outside is simple—my 27-watt iron did a nice job, and an iron of that size is small enough so that you don't run much risk of damaging the board. Unfortunately, two of the connections for each memory chip attach to the middle layers of the board, and the way Apple laid out the board makes the middle layer act as a heat sink, diverting the heat from the iron onto the traces—exactly what you don't want to happen!

So, if you're going through all the trouble of doing the four hours' work it takes to fatten a Mac, take some advice: desolder every connection for each memory chip, except those for pins 8 and 16, with a low-wattage iron, such as the 27-watt one I used. Don't even bother with pins 8 and 16 yet. Once you've cleared out all the other holes, *switch soldering irons*. I found that a 35-watt iron was the smallest that allowed me to get the solder out of pins 8 and 16. Be more careful with these pins than you were with the others—this step is tricky, and is the one point at which you are most likely to damage the motherboard.

Once you overcome this hurdle, things are easy again. Switch back to the low-wattage iron, solder in 16 sockets where the memory ICs used to be, solder in the extra required ICs and resistors, then stuff the sockets with 256K × 1 RAM chips. Voilà, you have 512K!

The low price for 256K RAM chips on March 1 was about $8 apiece. Thus, with a little shopping around and some intense work, you can fatten a Mac for less than $150.

Assuming that you do a good job, the only problem will be figuring out what to do if your machine needs repairs or you try to update to a Hyperdrive hard-disk drive. To install a Hyperdrive, the manufacturer, General Computer, desolders the 68000

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chip and installs a small disk-controller board. The Hyperdrive folks warranty the resultant Mac, but I'm not sure if they will if you've already taken a soldering iron to the board.

So far, I think that fattening my own Mac was worth it, but I'll let you know if I run into any problems.

Mike Lehman got frustrated with the pokiness of the Macintosh Finder when he was using system-development software, so he decided to do something about it. The result was FastFinder.

Mike is no newcomer to development. Before he formed Tardis Software (2817 Sloat Road, Pebble Beach, CA 93953) to distribute FastFinder, he was director of language development at Digital Research, and he's also the author of Digital Research's Pascal MT+.

To make a long story short, FastFinder drops the Mac's iconic (graphic) approach to displays and substitutes a more traditional, command-oriented interface. When you start up from a disk with FastFinder installed, you get an Enter command: message in an otherwise blank window in the middle of the screen.

One of the things that slows the Macintosh down seems to be the time it takes to calculate such things as the position of the various graphic elements and then show them. The manual claims that FastFinder runs as much as five times faster than Apple's Finder, although when I tried it with the Macintosh 3½-inch drives, FastFinder cut the time only in half.

Where FastFinder really excels is on a hard-disk drive, such as the Corvus. First, you can have up to 12 volumes (disks) on line at once, more than most hard-disk drives allow. Second, and more important, is that FastFinder has no limit on the number of files that can appear in one volume. The Apple Finder (version 1.1), on the other hand, bogged down on me at a grand total of 117 files (including folders). And, yes, you can put FastFinder on a hard disk so that you can start FastFinder up from the hard disk, although I'm not sure if you can do so with all hard disks. We've tested FastFinder with the Lisa (Mac XL), Corvus, Davong, and Hyperdrive hard-disk drives, and it does work with all of them.

If you don't have icons to look at, just how do you select files, erase them, move them around, and otherwise use the system? You have a choice: You can type commands, such as ERASE MY FILENAME, or you can pull down one of the menus at the top of the display and use it to start the command (see figure 1).

The FastFinder commands actually allow you to do a bit more than you can do with the usual Apple Finder—if you're familiar with

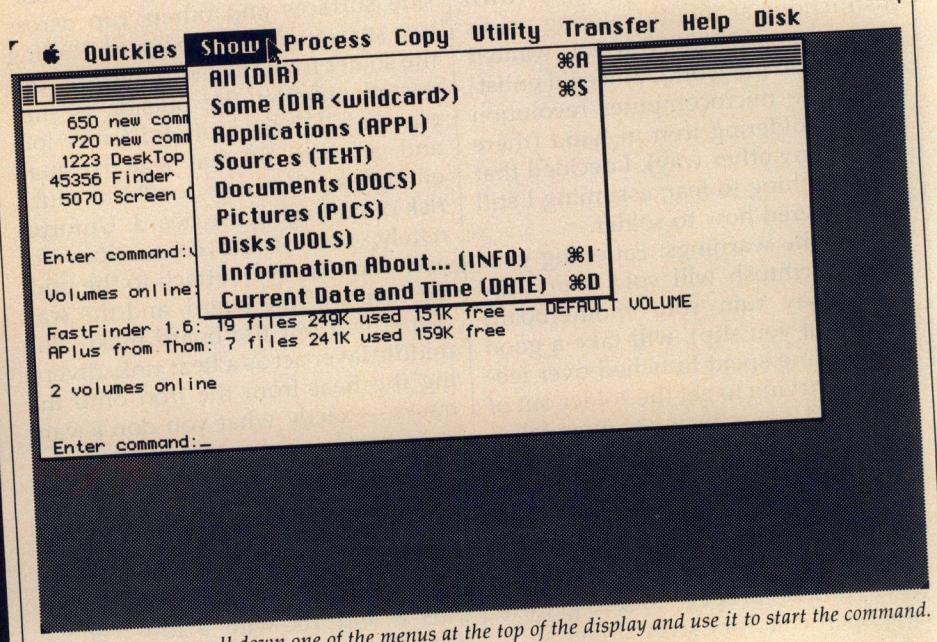

Figure 1: You can pull down one of the menus at the top of the display and use it to start the command.

IT WAS HER EYES...

. . . that tipped me off. They looked out through the fancy fur and perfume and told me something was wrong, dead wrong. I'd seen those eyes somewhere, in some long forgotten place, some dingy nightclub on the south side of Chicago. But here she was, strictly East Side Manhattan, if you catch my drift.

She was askin' me to stick my neck out for the long green, but a nasty feeling made me think twice before I made my move. I had to put those eyes to a face, and fast. The solution was on my desk: MAC PRIVATE EYE.™ One quick call to my inside man at headquarters was all it took. Within seconds he copied the mug shot with his MAC PRIVATE EYE video digitizer, modemed it straight to my Macintosh,™ and put the I.D. on this dame. The $595.00 I spent on that MAC PRIVATE EYE probably saved this flatfoot from some serious trouble. One thing WAS clear, my MAC PRIVATE EYE would never leave me short for important information like maps, graphs, blueprints, photos, security I.D.'s, and a thousand other things I hadn't thought of yet. There was only one question; how did I ever get along without it?

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CP/M or MS-DOS, you'll feel right at home. Here's a quick list of the FastFinder commands:

copy	(copy files)
dir	(show a directory)
erase	(erase files)
rename	(rename files)
do	(perform list of commands)
lock	(lock a file)
unlock	(unlock a file)
novice	(set high protection level)
expert	(set low protection level)
setattr	(set file attributes)
startup	(change start-up file)
print	(print a document file)
terse	(short, concise messages from FastFinder)
verbose	(longer, better messages from FastFinder)
vols	(directory of volumes on line)
info	(see info about files)
date	(show time and date)
search	(look for text in files)
scan	(count bytes, words, lines)
combine	(make two files into one)
compare	(show how two files are different)
type	(display in ASCII the contents of a file)
dump	(display in hex the contents of a file)
list	(prepare a listing file with date)
record	(capture a series of commands you type for later recall)

An impressive list of commands, to say the least.

Why would you want to give up Apple's beautiful pictures for a touch-typing session? If the speed increase in invoking or moving between applications isn't enough, think of the other things FastFinder allows you to do. You can prepare a "script" of commands you want executed in order. I put together a short script that starts up the C compiler, compiles my files, links them, installs the resources, and then prints out listings of all of them with the time and date. Compiling no longer means a lot of pointing and clicking. Yes, you can do some of the same things with the transfer routines in the development-system editor, but not with the same degree of sophistication.

Likewise, the information FastFinder presents in a verbose directory of files (see figure 2) is more enlightening than Apple's. Note that the directory shows the size of the data and resource forks of every file, identifies the file icons and the file types, and gives the application IDs in addition to the usual name, date, and size. During development of new programs, I find this information handy, although in the everyday course of events, I can easily live without this overkill.

FastFinder is not without its faults. I wish that you could *set* the time and date from the command line, instead of just displaying it. If you pull down

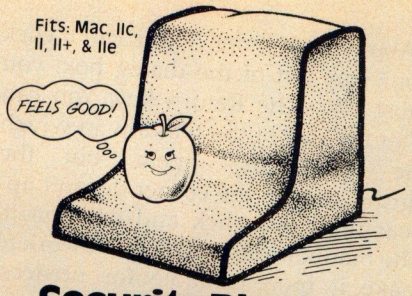
```
 Quickies  Show  Process  Copy  Utility  Transfer  Help  Disk
Drive: 2, Volume: FastFinder 1.6

Data   Rsrc   Total  Fnum Fl TYPE APID Modification Date  File Name

5120  127423  132543     1 31 ZSYS MACS 11:46:19 21-Nov-84 System
   0   17254   17254     6 11 PRES MACS 01:56:30 20-Nov-84 Imagewriter
   0    1280    1280    82 81 APPL Mike 21:43:39 20-Nov-84 SystemDisk
 276     486     762    83  1 TEXT EDIT 23:01:04 28-Jan-85 Read Me First!
 130       0     130    85  1 TEXT EDIT 13:19:03 21-Nov-84 fastfinder install
 160       0     160    86  1 TEXT EDIT 13:19:47 21-Nov-84 fastfinder install 2
 373     486     859   101  1 TEXT EDIT 01:29:39 18-Jan-85 Rel notes part 2
  22       0      22    14 11 CLIP MACS 01:53:29 18-Jan-85 Clipboard File
   0     566     566    81  1 ZSYS MACS 12:14:46 21-Nov-84 Scrapbook File
2048       0    2048    90  1 ZSYS MACS 09:03:19 30-Nov-84 Note Pad File
21888      0   21888    99  1 SCRN NONE 01:59:46 18-Jan-85 startupscreen
 436     486     922   100  1 TEXT EDIT 01:28:35 18-Jan-85 Rel notes part 1
 428     486     914   109  1 TEXT EDIT 01:34:41 18-Jan-85 new commands part 3
 284     486     770    94  1 TEXT EDIT 01:51:48 18-Jan-85 ffinfo
 302     348     650   102  1 TEXT EDIT 01:31:28 18-Jan-85 new commands part 1
 372     348     720   103  1 TEXT EDIT 01:34:40 18-Jan-85 new commands part 2
   0    1223    1223   114 40 FNDR ERIK 07:43:52 14-Jan-04 DeskTop
   0   45356   45356   115 11 APPL      12:57:37 28-Jan-85 Finder
5070       0    5070   116  0 PNTG MPNT 07:44:38 14-Jan-04 Screen 0
8521       0    8521   117  0 PNTG MPNT 07:45:56 14-Jan-04 Screen 1

Enter command:_
```

Figure 2: A FastFinder directory shows the size of the data and resource forks of every file, identifies the file icons and file types, and gives the application IDs.



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	107	IIc Unicover for Computer, Stand & Mon. IIc
Drive Covers $6.50	103	2 Drive Disk II Stack
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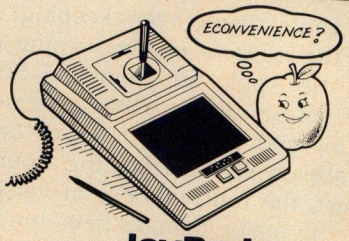

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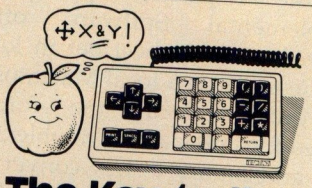

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CIRCLE 173 ON READER SERVICE CARD

"About FastFinder," you can't click your way out of the dialog box; you must press the Return key. You can alter the size of the window in which the commands appear, but the "grow" box in the corner doesn't appear until you click and drag on it. The manual could use a bit of work to make it more suitable for novices, and the hard-disk connection could be better described.

All in all, however, FastFinder does pretty much what it claims to and will speed us developers on our way. By the way, FastFinder was written in Consulair C, the product I wrote about last month.

Miscellany

If you haven't been keeping up with the *constant* changes going on with the Apple Supplemental Software, you should note that some new utilities and some updates of ones that already exist are floating around.

First, the font editor is in version 2.02. No major changes here, but it's a step in eradicating a few bugs. Second, RMover (or Resource Mover on some disks) has pretty much been superceded by REdit (Resource Edit). This program finally allows you to do most resource maintenance work in a single batch, with one tool. I'm not sure if Apple is directly distributing these files or not, since I'm not about to pay another $100 just to see what files the company's shipping for the Supplemental Software offering these days. Your best bet in looking for these files is a local Macintosh users' group. I found the aforementioned files plus a font doubler, RAM test, and binary-to-hex converter on disk 5 of the Stanford Macintosh User Group library. At the MacWorld exposition, I noticed that most of the users' groups that exhibited there all had roughly the same files available, albeit on different disks. Check with your local users' group—it's worth the few bucks it takes to join.

While I'm on the subject of things to join, you should take a close look at *MacTutor*, a newsletter for Macintosh programmers (formerly *MacTech*, before a trademark difficulty got in the way; actually, the new name may also bring up trademark questions—I've seen at least two other organizations claiming ownership of the name MacTutor). The first issue didn't do much for me, but the subsequent ones have been first class. Columns on C, BASIC, Pascal, Forth, and assembly language all grace the pages of MacTutor. You'll find this newsletter an invaluable source of technical information. Subscriptions are $24 a year (12 issues); MacTutor, P.O. 846, Placentia, CA 92670; (714) 993-9939).

Meanwhile, some of the products I've mentioned in previous columns have been updated. The Softworks C compiler, for instance, has undergone a recent revision. I can't really keep track of all the revisions of software and let you know in a timely fashion when they change, so, starting with this column, if there's a version number for the product I'm looking at, I'll give it in the text. That way you can ask the developer what's new since the version I reviewed.

MacNosy

Hmmm . . . What to say about this product? Well, it certainly isn't for everyone out there in readerland, yet this surprisingly powerful tool can certainly do things other disassemblers I've seen for the Mac can't.

To start with, you'll need a 512K Mac or a Mac XL (Lisa) with at least that much memory running MacWorks. Call up MacNosy, tell it what program (or ROM) to work on, and you'll be greeted with some cryptic (but decipherable) messages.

MacNosy is what I'd have to call a "threaded disassembler," for lack of a better term. MacNosy looks at the code of the program you instruct it to inspect, figuring out how many procedures and instructions it has and where the various procedures call one another; then it substitutes names for as many of the routines and data structures as it can.

From there, you're on your own. What you can do with MacNosy is limited only by your curiosity and intelligence. The documentation, although limited, does a decent job of getting you started. The version I've been using doesn't have all of the eventual features working, but it does have enough to do a decent disassembly of the ROM or any program you might happen to have lying around.

The author of MacNosy, Steve Jasik, seems to have the best understanding of the Macintosh's internal workings of any non-Apple-taught person I've met. I can barely follow

```
Resource file #$0020                                  Map at $00FD20    Attributes: rcw
'ICN#'  $0080  ..P.T...  Nowhere
'ICN#'  $0081  ..P.T...  Nowhere
'RSC#'  $0000  ..P.T1..  At $00ED8E
'RSC#'  $0001  ....T...  Nowhere
'STR '  $0100  ....T...  Nowhere
'STR '  $0102  ....T...  Nowhere
'STR '  $0104  ..P.T1..  At $00FFDE
'STR#'  $0001  ....T...  Nowhere
'MENU'  $0002  ....T...  Nowhere

DUMP FROM 000000
000000:VN  FF FB 42 4A  FF FF FF FF  00 07 22 F0  00 07 22 F2  ..BJ......"...".
000010:    00 07 22 F4  00 07 22 F6  00 07 22 F8  00 07 22 FA  ..".."..".."...".
000020:    00 07 22 FC  00 07 22 FE  00 07 22 38  00 07 23 00  ..".."..."8..#.
000030:    00 07 23 02  00 07 23 02  00 07 23 02  00 07 23 02  ..#...#...#...#.
000040:    00 07 23 02  00 07 23 02  00 07 23 02  00 07 23 02  ..#...#...#...#.
000050:    00 07 23 02  00 07 23 02  00 07 23 02  00 07 23 02  ..#...#...#...#.

DISASSEMBLY FROM 002FB2
002FB2:    _DrawString
002FB4:    PEA      ^$002F38
002FB8:    MOVE.L   (A7),-(A7)
002FBA:    MOVE.L   (A7),-(A7)
002FBC:    MOVE.L   (A7),-(A7)
002FBE:    MOVE.L   #$00100010,-(A7)
002FC4:    _FrameRoundRect
002FC6:    MOVE.L   #$00030003,-(A7)
002FCC:    _InsetRect
002FCE:    MOVEA.L  (A5),A0
002FD0:    PEA      $FFE8(A0)
002FD4:    _PenPat
002FD6:    MOVE.W   #$000B,-(A7)
002FDA:    _PenMode
002FDC:    _PaintRect
002FDE:    _PenNormal
002FE0:    MOVE.L   #$FFFDFFFD,-(A7)
```

```
TMON version 1.530          Configure
                            Monitor
Written by
Waldemar Horwat             Monitor...
©1985 TMQ Software, Inc.    Launch
1110 Lake Cook Road
Buffalo Grove, IL 60090     Quit
```

Figure 4: An example of the TMON screen itself

Figure 3: Three printouts of on-screen windows using TMON.

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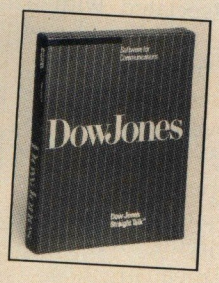

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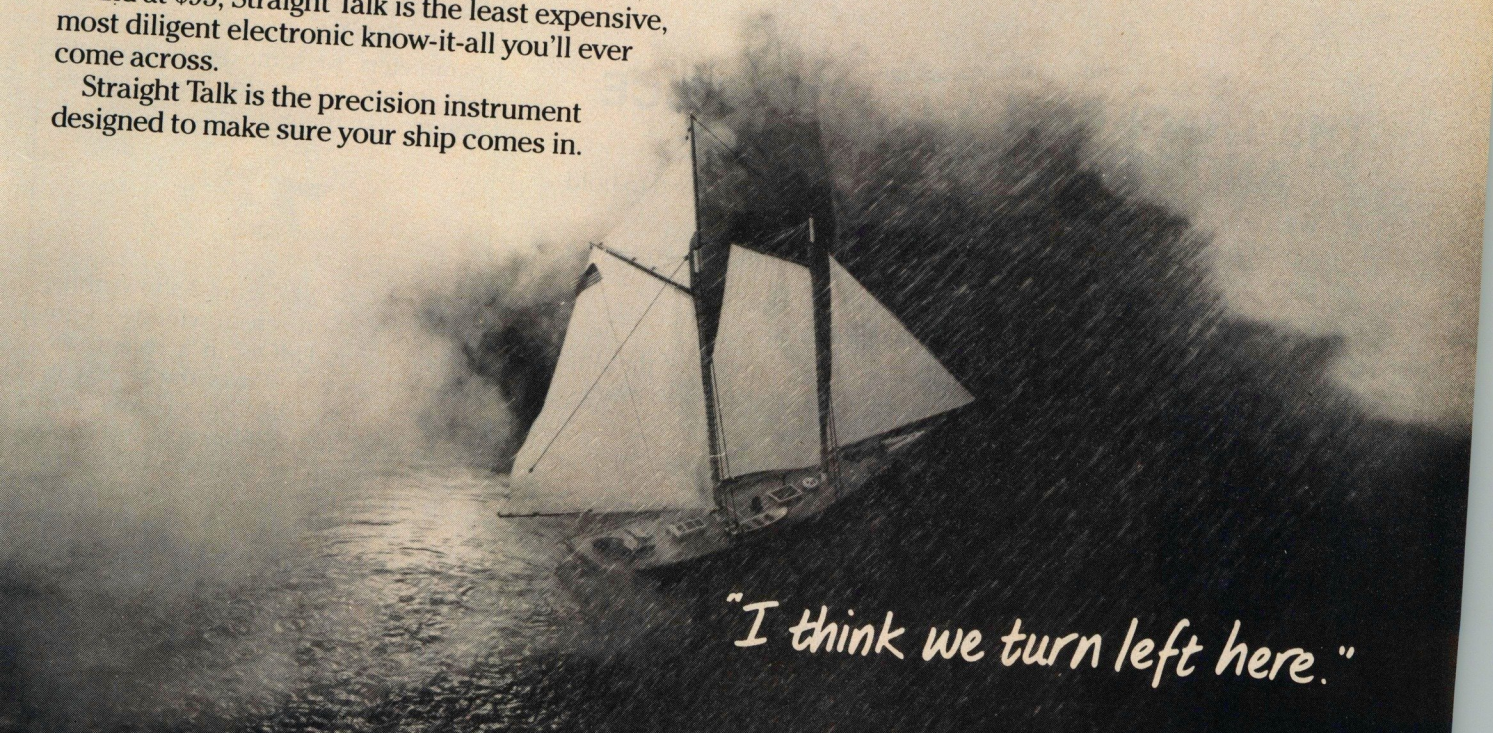

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CIRCLE 234 ON READER SERVICE CARD

him when he sits down with MacNosy and shows me around sections of the ROM and describes what they do.

I also can't begin to explain all of MacNosy's functions. The command lines are dense and full of abbreviations that will take you a few days to figure out. Note how MacNosy has substituted labels for data wherever it can. Some of these labels can be misleading, but more often than not, MacNosy is right in deciphering meanings.

Jasik promised me a newer, improved version of MacNosy when I met him at the MacWorld exposition, so I'll cut this report short and bring you up to date in a future column. If you'd like a copy of the program, the current price is $50; send the money to Steve Jasik, 343 Trenton Way, Menlo Park, CA 94025.

Another Debugger

Yet another debugger has made it to market. This one is called TMON, from TMQ Software (1110 Lake Cook Road, Buffalo Grove, IL 60090).

TMON appears to be the debugger that Apple should have given us, but didn't. At present, it is the only one that allows you to see your program's full screen image while debugging on a 128K Macintosh. True, you can debug only smallish programs (perhaps as big as 8K) this way, but that's better than Apple was able to do with its debugger.

More important, TMON has several useful extensions that other Mac debuggers don't. One of the best examples is the File command, which opens up a window that shows you all the resources associated with a given file and where those resources are at any given moment. ("Nowhere" means it is still on the disk and hasn't been moved into memory yet; "on disk" would have been a better name, but most people who write debuggers aren't particularly concerned about clarifying what on-screen terminology means.)

All ROM Toolkit traps are displayed by name, an especially helpful feature when you're using TMON to look at the assembly code for a given memory region. As with most debuggers, you may examine and modify all of the 68000's registers at any time, look at the status of the flags, dump sections of memory in hex, single-step a program, and set breakpoints (up to seven in TMON). These basic abilities allow you to examine a program one instruction at a time and learn exactly what it is doing and when. TMON also lets you change parameters to some instructions to test other values for the routines you're examining.

Figure 3 shows three printouts of on-screen windows I got while using TMON in a recent session. (Figure 4 shows the screen itself—TMON, like most low-level debugging tools, intercepts the Finder's Save screen command, holding onto it until you leave the monitor section of the program, at which time it processes all ⌘ 1–4 keystrokes—an ingenious solution to a problem with many of the Macintosh debugging tools that I have seen.) Note the clear format in each of the windows—even people who do not know assembly language should be able to figure out what each item is.

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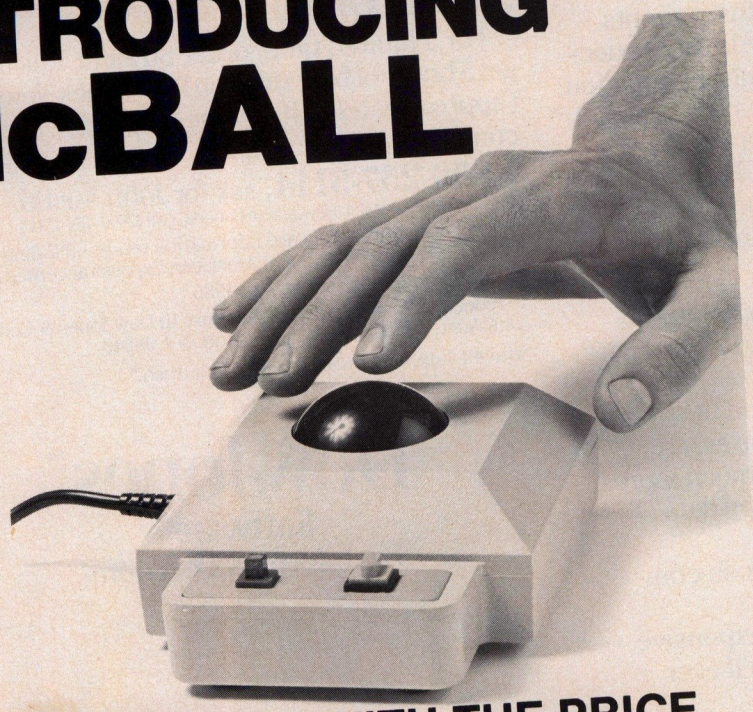

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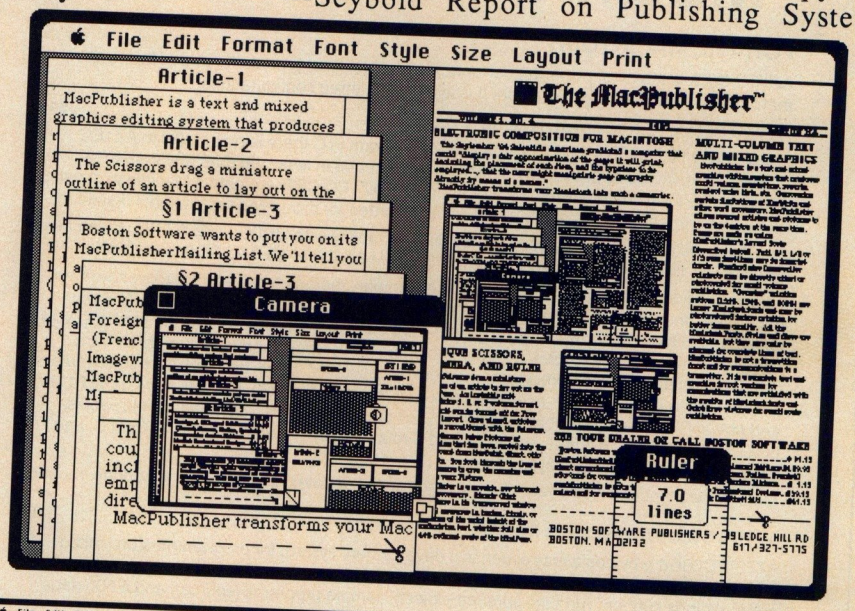

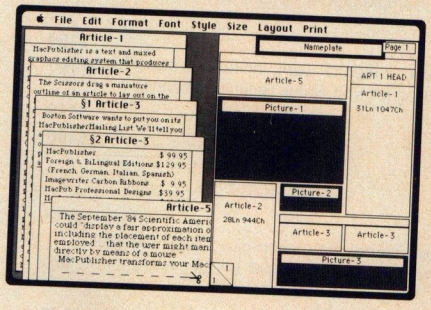

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CIRCLE 189 ON READER SERVICE CARD

TMON's weakness, if it has one, is its manual. The title page does say, "This is a technical manual . . . It is not intended in any way to be a tutorial." That's an understatement, at best. It took me much longer than it should have to figure out how to grab a program and examine it under TMON. Giving commands to the program itself is reasonably simple but enough unlike the usual Macintosh methodology to slow down the occasional debugger. For example, the top line looks like a menu bar but is actually a series of buttons. You can move windows by putting the mouse anywhere in them and dragging up or down (no left or right movement is allowed, since each window takes up the full width of the display). The scroll bars on the right look like Macintosh scroll bars, but they also don't quite work like the normal ones do. All in all, these differences are not important, but they will slow some of you down while you're first exploring the program.

This program offers a lot more than what I can fit into this potpourri column, but TMON leaves a few things to be desired: a manual with more tutorial material, quicker ways to move around in memory sections than using the scroll bar or faking the program out with short assembly routines, and perhaps a less convoluted method of getting programs set up for disassembly. Nevertheless, it is the handiest debugger I've seen for Macintosh assembly-languge programmers and worth the effort to learn.

Not Caught Up, But Close Enough

There's still a pile of Macintosh programming information sitting on my desk, but I did put a dent into it this time around.

I've been asked to write about Creative Solutions' version of Forth for the Macintosh, a product that has been used to create many programs for the Mac (including Peachtree's Back to Basics accounting package, of all things). This Forth is probably the best language on the Macintosh at present, so we'll take a close look at it next time. Till then, why not nose around a little with some of the products I've mentioned in this column? ✚

Thom Hogan is editor-in-chief of Business Software *and has written numerous computer-related books, including* InfoWorld's Essential Guide to the Apple II.

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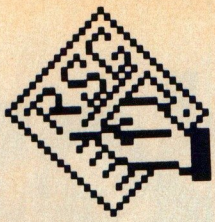

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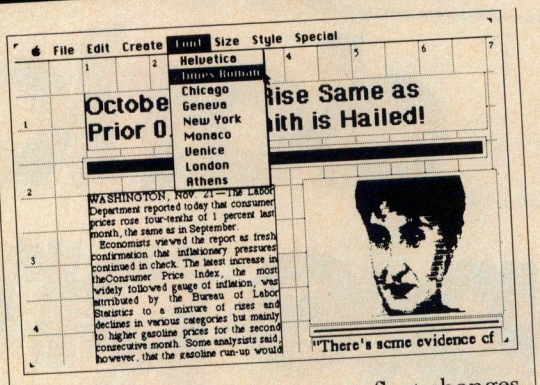

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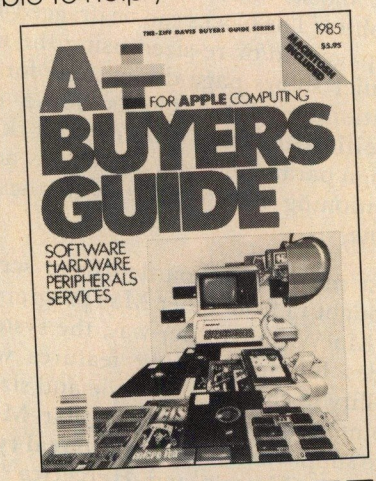

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FROM THE PUBLISHERS OF
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MacTips

Suggestions from our readers

DIFFERENT FONTS FOR DIFFERENT FOOTERS

When you work with the Header option and Footer option in MacWrite, you can use multiple fonts and font sizes. For example, you can design a letterhead with the first line in 14-point bold and the remaining lines in a smaller point size. The automatic page numbering and dating are formatted in the font, style, and point size of the first character in the header. Thus, if you type the word *Page* to precede the automatic page number, the font and style of the two will not be identical.

To solve this problem, simply type a space (one press of the space bar) as the first character in the header. Set the font, size, and style of this space to correspond with the style you desire for the auto date and page numbering. After you've set this first space, the remaining characters can have as many font and style changes as you desire, but the page numbers, time, and dates will always be in the style you set for the first character.

Tom Neudecker
Pittsburgh, PA

MOUSE WASH

After your mouse has scurried across your desktop for several weeks, you may discover that the cursor does not seem responsive. You try to pick up an icon quickly and dump it into the trash can, and the pointer sticks, and stumbles on itself. Chances are your Macintosh is not overheating, nor is the connection from the mouse to the Mac going bad. Your mouse simply needs some tender loving care.

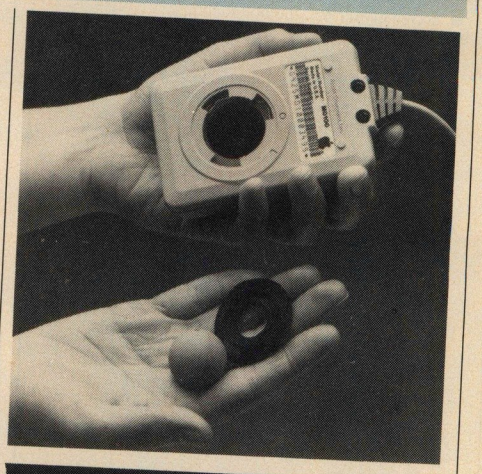
Turn the mouse over, and you will see a rubber ball that allows you to roll the mouse over a surface easily. Further inside the mouse are three cylinders in contact with the rubber ball. As you roll the mouse across a surface, the rubber ball picks up dust and other debris that presses against the three internal cylinders. After the cylinders build up enough lint and debris, the rubber ball no longer rotates smoothly, which causes the cursor or pointer to stick and stumble. To keep your mouse sliding smoothly, you only need to open the mouse and clean the cylinders.

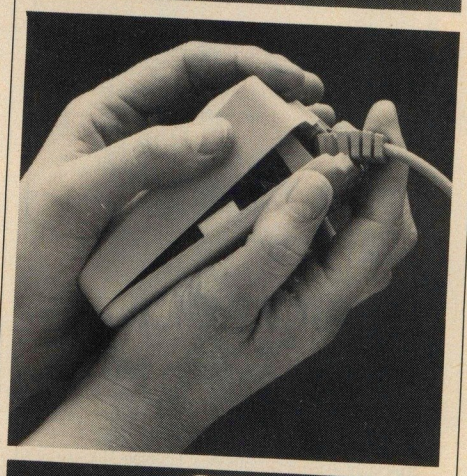
Holding the mouse upside down, remove the rubber ball by turning the black retaining ring counterclockwise until it stops (see figure 1). The marker on the washer should have rotated from the L (lock) to the O (open) position. Turn the mouse right side up again, letting the rubber ball and black retaining ring fall into your hand.

Next, after removing the two Phillips-head retaining screws, gently pull open the case from the cord end while pushing the base of the cord out of its resting place (see figure 2). Now you should be able to see the three cylinders inside the mouse clearly. Attached along the shaft of the two black cylinders are optical wheels that measure the movement of the rubber ball. The third silver cylinder just supports the rubber ball. Do not try to remove the black cylinders for cleaning; the posts holding these cylinder assemblies in are rigid and break easily (see figure 3). Clean all three cylinders with a cotton swab and denatured alcohol. Gently swab each cylinder, rubbing from front to back, removing the residue buildup until the surface is smooth. Remove any lint from the shafts of the black cylinders and clean the rubber ball with a soft, clean, dry cloth.

To reassemble the mouse, make sure the mouse button and spring are correctly seated in the housing, reinsert the base of the cord into the housing, and replace the two retaining screws. Finally, put the rubber ball inside the mouse and lock it into place with the black retaining ring.

A+ Editors





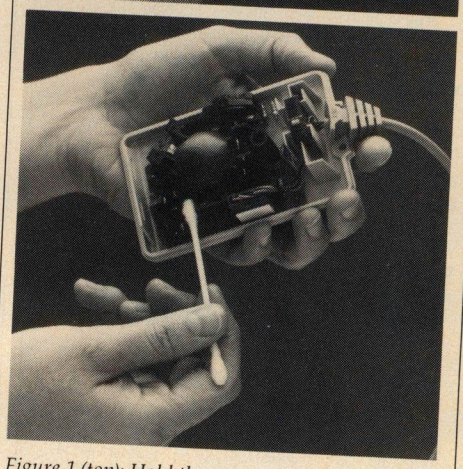


Figure 1 (top): Hold the mouse upside down to remove the rubber ball.
Figure 2 (center): After removing the retaining screws, gently pull open the case.
Figure 3 (bottom): Clean the three cylinders with a cotton swab and denatured alcohol.

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MacTips

PLOTTING ERROR BARS

Microsoft's Chart is a powerful tool for creating and printing graphs, but it is intended primarily for business uses. It thus lacks several features that are necessary for scientific applications. In particular, Chart does not provide a means for plotting data points with error bars.

Fortunately, you can remedy this deficiency by creating a data table with a spreadsheet or with MacWrite. In the example in figure 4, I constructed a line graph by creating a data table with MacWrite. In the left column are the x values with which the average y values (second column) are associated. The average y value plus the standard deviation are in the third column, and the average y values minus the standard deviation are in the fourth column. Each of these y values is associated with the x value in the first column.

If you create a data table like this one, transfer the data to the clipboard, then run Chart, and follow the directions below, Chart will produce a line graph like the one in figure 5.

To enter data from the clipboard into Chart, go through these steps:

1. Run Chart
2. Data Menu: select Number
   Specify filename
3. Edit Menu: Paste
4. Data Menu: List, select Plots
5. Click on Graph
6. Chart: Main = Line
   Overlay = Line
7. Format: Main ▸ Hi-Lo ON
   Overlay ▸ Hi-Lo ON
   Lines Connecting: OFF
   Markers: OFF
   Include Series . . . 2

A.P. Shepherd
San Antonio, TX

ANIMATION IN MACPAINT

It is possible to create a form of animation with MacPaint. The first step is to draw a rectangle about one half the size of the screen, filled with narrow horizontal or vertical lines.

Next, select the lasso and draw a shape such as the bird in figure 6. Lasso the shape, press the Option key, and move the shape to the right of the rectangle. This procedure gives you a contrasting shape (the Option key leaves the shaded area filled in).

Lasso the second shape and place it on top of the first one, so that the central part overlaps and creates a black area (see figure 7). Next, lasso the doubled figure and copy the shape, using Copy from the Edit menu. Fill the *entire screen* with narrow horizontal or vertical lines. Finally, select Paste from the Edit menu and move the bird shape across the screen (see figure 8). The wings of the doubled bird will flap as you move it.

Thanks to Will Hemmick of Computer Solutions of San Antonio, Texas, who pointed this technique out to me.

Dan Eggleston
Austin, TX

Figure 5: If you create a table like figure 4 and follow the instructions outlined here, Chart will produce a line graph like the one below.

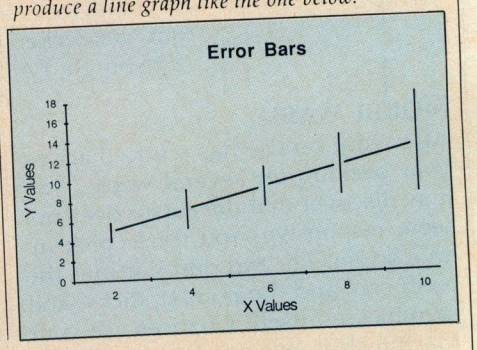

Figure 4: Format for MacWrite data file to put on the clipboard. Select and transfer only data below the line. Note that the number of rows must equal or exceed the number of columns. Tabs separate columns, and a carriage return ends each row.

X-Value	Average	Average + Error	Average -Error
2	5	6	4
4	7	9	5
6	9	11	7
8	11	14	8
10	13	18	8

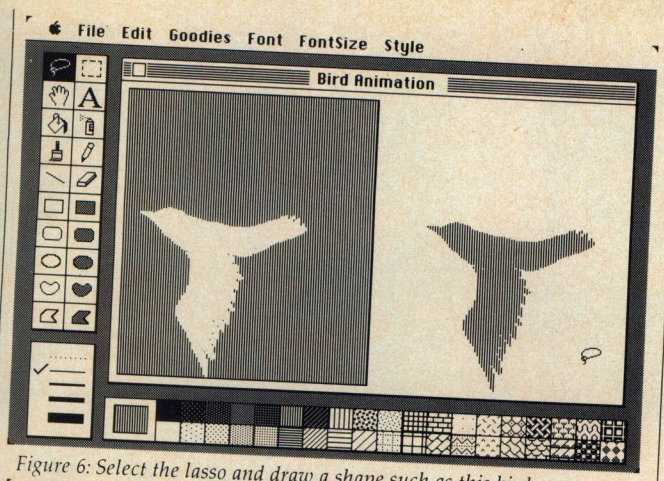

Figure 6: Select the lasso and draw a shape such as this bird.

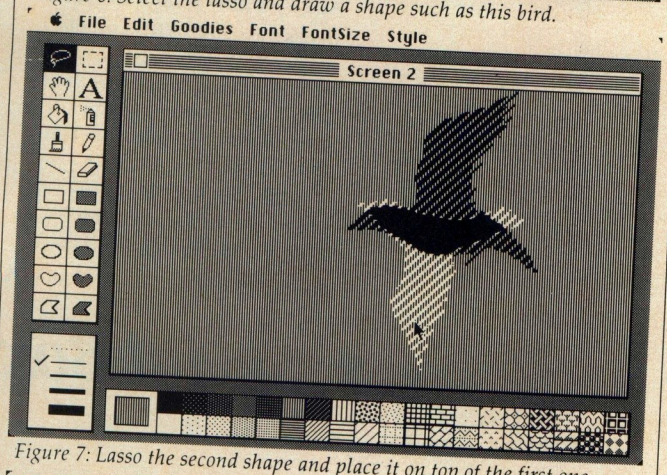

Figure 7: Lasso the second shape and place it on top of the first one.

Figure 8: Select Paste and move the shape across the screen.

RESTORING CLIPBOARD CONTENTS

You have something important on the clipboard, and you choose Cut to delete a segment of your MacWrite or Word text. The original contents of the clipboard are lost forever, right? Wrong. If you choose Undo, not only will the cut contents be returned to the document, but the clipboard will be restored to its prior state, with the important text back on it again.

WORD DELETE IN MACWRITE

If you double-click on a word in MacWrite, the characters of the word will be highlighted, but neither the leading nor the trailing space will be selected. If you want to delete a selected word, pressing Backspace will erase only the characters, and you have to press Backspace again to get rid of the extra space. But if you choose Cut when you select a word, both the word and one of the spaces will be erased.

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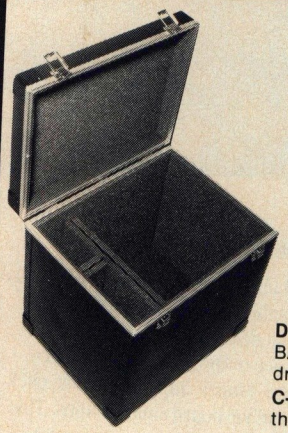

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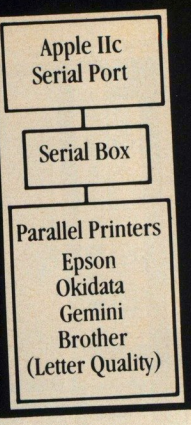

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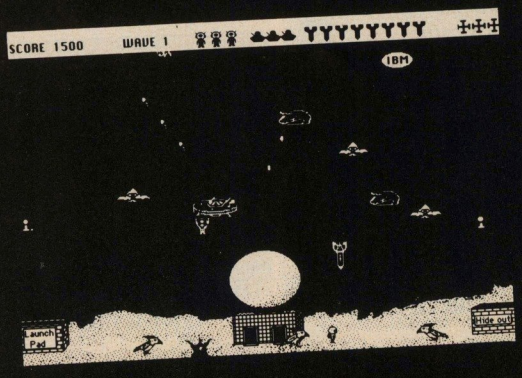

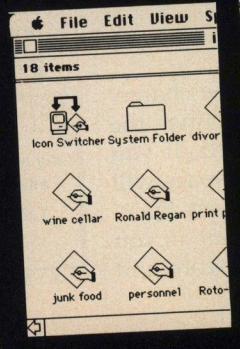

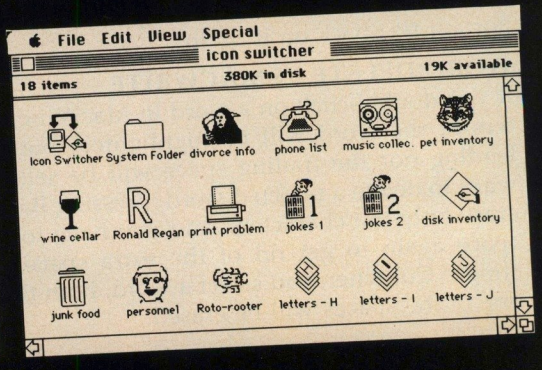

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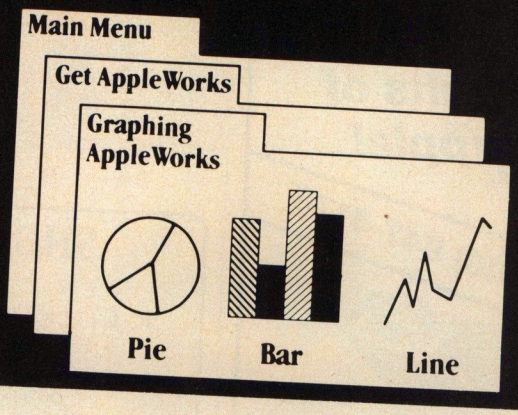

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MacTips

SHORT CUTS FOR FAT BITS

1. Click icon and move it to work area.
2. Press ⌘ key and click mouse to enter Fat Bits.
3. Press / release Option key to toggle between the and while editing and scrolling Fat Bits over large areas.
4. Press ⌘ key and click mouse to return to drawing.

Figure 9: An easy reference guide to FatBits shortcuts.

FATBITS SHORTCUTS FOR MACPAINT USERS

I use the FatBits option in MacPaint quite a bit and thought I'd share with your readers an efficient and speedy system of using FatBits. The chart in figure 9 (above) is an easy reference guide to the shortcuts I use.

By using three adjacent keys with the left hand (Shift, Option, and ⌘), I can constrain, toggle between scrolling and editing, and toggle in and out of FatBits, a method that is much easier than going to the menus.

Dick Roller
Paris, IL

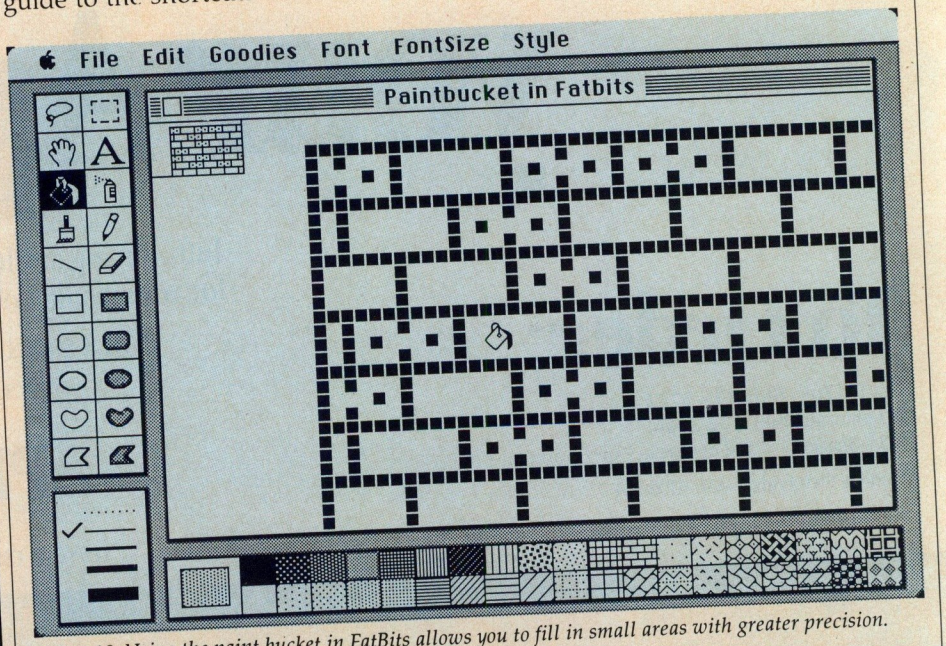

Figure 10: Using the paint bucket in FatBits allows you to fill in small areas with greater precision.

PAINT BUCKET IN FATBITS

If you want to fill in small areas with the paint bucket in MacPaint, it is often difficult to put the spout of the bucket in exactly the right place, and you sometimes end up with pattern spilling into areas where you don't want it. You can use the paint bucket in FatBits, though. The area is magnified, but the bucket remains the same size, so you can place it exactly where you need it (see figure 10). All of the other tools can also be used in FatBits. It is particularly interesting to see the spray can producing its pattern in a magnified form.

E.A. Follows
Victoria, B.C., Canada

A+ Macintosh DIRECTORY

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Standard listings consist of a bold lead line (23 characters maximum); 7 lines of body copy (45 characters per line); 4 lines for company name, address and telephone number. $115 per insertion—3 issue minimum. Additional charge for extra lines and company logos. Prepayment, frequency and multi-title discounts available. American Express, MasterCard, Visa accepted. Copy subject to publishers approval. Send typewritten or printed copy, reproducible logo art (if applicable) and remittance to Kathryn Cumberlander, Classified Sales Manager, Ziff-Davis Publishing Company, One Park Avenue, New York, NY 10016. For additional information, assistance, or to place an order by phone, call collect (212) 503-5115.

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▶ FORTIS DX-15XL PRINTER

Fortis is a faster version of Dynax's DX-15 printer. The letter-quality unit with standard Centronics parallel interface and optional tractor feed, emulates Diablo control codes. Features of the printer include a front control panel, optional keyboard, and cassette daisy-wheel and ribbons. *(List Price: $599)*

Requires: Any Apple computer

Dynax, Inc.
6070 Rickenbacker Road
Commerce, CA 90040
(213) 727-1227

CIRCLE READER SERVICE NO. **501**

II SERIES III

▶ COMPUTEREYES VIDEO SYSTEM

This video-acquisition system captures full-screen images on Apple's high-resolution display. Its slow-scan device connects between any standard video source and Apple's game I/O socket. Black-and-white images appear within five seconds; gray-scale images are provided by two multiscan modes. Computereyes' applications include pattern recognition, security, quality control, spatial measurement, robotics, artificial intelligence, and industrial controls. Comprehensive software comes with the system. *(List Price: $129.95)*

Requires: Apple II, II Plus, IIe, or III in Emulation mode

Digital Vision, Inc.
14 Oak Street
Suite 2
Needham, MA 02192
(617) 444-9040

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II SERIES III MAC

▶ 2424AD MODEM FROM CTS DATACOMM

The 2424AD is a recent addition to the Companion Modem Series. This 2400-bps, auto-dial, two-wire, full-duplex modem meets CCITT V.22 bis requirements. Synchronous or asynchronous operation is possible at 2400 or 1200 bps. The unit can also fall back to 300-bps asynchronous operation. Automatic dialing is possible with memory storage of up to ten telephone numbers. Other features of the 2424AD include adaptive dialing, line-status detection, and RJ-11C and RS-232C interfacing. *(List Price: $795)*

Requires: Apple II, II Plus, IIe, IIc, III, or Macintosh

CTS Datacomm
6900 Shady Oak Road
Eden Prairie, MN 55344
(612) 941-9100

CIRCLE READER SERVICE NO. **503**

MAC

▶ VIDEO SYSTEMS FOR THE MAC

Two new video systems for the Macintosh are available from Professional Data Systems. The Big Mac Monitor system reproduces any Macintosh display, including fine text and high-resolution graphics. Users connect several Monitors in a series when multiple displays are required. Included with the Big Mac display is the PDS External Video Card, which works with the Monitor to provide high-resolution reproduction.

The Project-A-Mac, a giant-screen video system, projects the Mac display on screens up to 20 feet across. The resolution on the screen is the same as the Mac's small-screen resolution. The Project-A-Mac System includes a video projector and the PDS Video Card. *(List Price: Big Mac Monitor, $1995; Project-A-Mac, $4495)*

Requires: Macintosh

Professional Data Systems
20 Sunnyside Avenue
Mill Valley, CA 94941
(415) 383-5537

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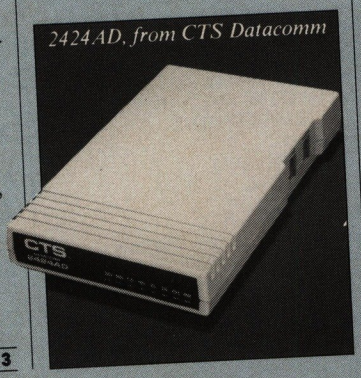
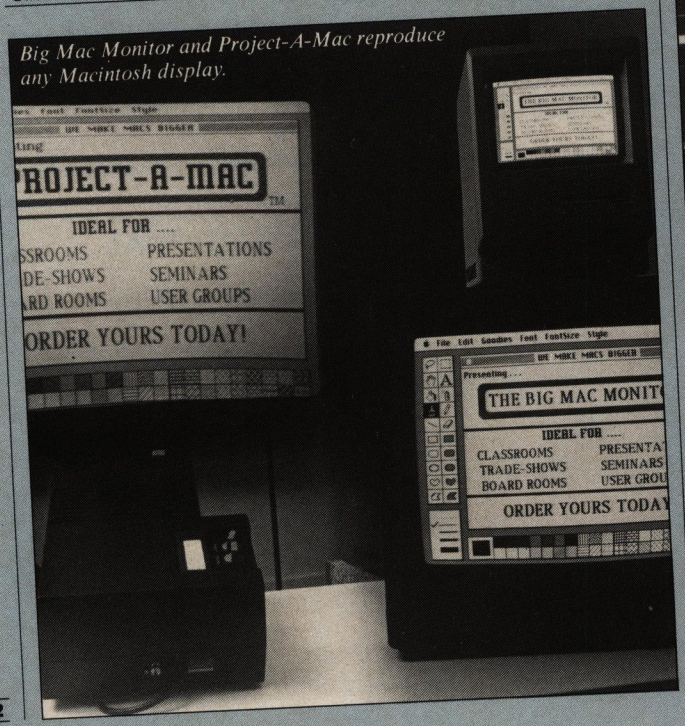
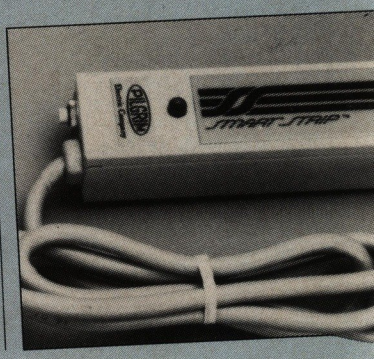
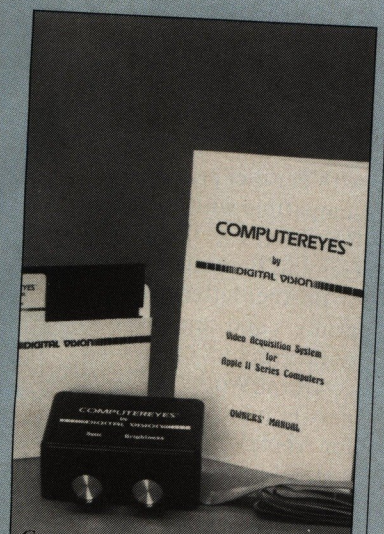


2424AD, from CTS Datacomm



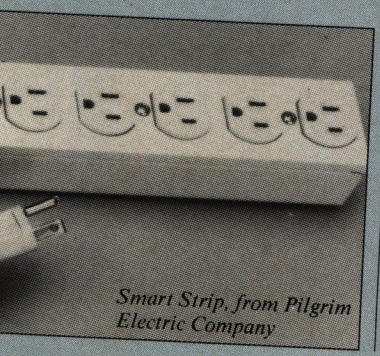
Big Mac Monitor and Project-A-Mac reproduce any Macintosh display.





Computereyes, a video-acquisition system from Digital Vision, Inc.

Creative Cabinet's handcrafted cabinets.


Smart Strip, from Pilgrim Electric Company

II SERIES

▶ KEEPING SAFE CHILDREN'S PROGRAM

Keeping Safe is designed to teach children of 5 years and older how to handle potentially dangerous situations. The program projects a variety of encounters ranging from "strangers in cars" to dealing with "people you know." Children learn to make good decisions to help characters Buddy and Sally stay safe in their daily activities.

Keeping Safe helps children deal with dangerous situations.

After each answer to a problem, the program provides reinforcing or corrective feedback. The disk also contains an action-packed game called Scuba Scramble. *(List Price: $49.95)*

Requires: Apple II, II Plus, IIe, or IIc

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Shawnee Mission, KS 66208
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in AL, HI, or MO (816) 523-1059

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▶ SMART STRIP POWER CONTROLLER

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A current-sensing circuit monitors the current through this socket. When the master switch is on and current of more than 0.2 amps flows through the socket, other outlets automatically switch on after a brief time delay. If the master switch is off and a current of less than 0.1 amps flows through the socket, other outlets also turn off. Smart Strips are rated at 15 amps, 125 volts, 60 Hz, 1875 watts continuous duty. *(List Price: Model MS-4 [4 outlets], $95.25; Model MS-6 [6 outlets], $99.50)*

Pilgrim Electric Company
105 Newtown Road
Plainview, NY 11803
(516) 420-8990

CIRCLE READER SERVICE NO. **506**

Fortis DX-15XL letter-quality printer, from Dynax, Inc.

II SERIES III MAC LISA

▶ CREATIVE CABINETS

These handcrafted cabinets from the Orient house electronic equipment, with space for your computer, monitor, phone, modem, storage of diskettes (two drawers), VCR, and cassettes. Your computer sits on a typewriter-height, slide-out shelf. The cabinets come in three finishes: camphor burl, teak, and black lacquer; and two models: one with rollaway printer cart and one with extra shelf and drawer space. The cabinet closes when not in use. Its dimensions are 48 × 61½ × 24 inches. *(List Price: $1995–$2295)*

Creative Cabinets
2924 Veranda Drive
Springfield, VA 22152
(703) 455-4958

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HARDWARE

SUN-NET II FILE SERVER

The Sun-Net II File Server is a network that allows multiple users to write on the same disk volume simultaneously without file degradation. When configured with Sunol's Sun-Mac, it enables up to 31 Macintosh computers to be networked on AppleTalk LAN. These configurations allow IBM PC, Z80's Base CP/M 80, and the Macintosh computers to share the same Mass Storage Unit. It is the first fileserver with the ability to transfer text files between different types of computers. *(List Price: $995)*

Requires: Apple II, II Plus, IIe, IIc, III, Lisa, or Macintosh

Sunol Systems
P.O. Box 1187
Pleasanton, CA 94566
(415) 484-3322

CIRCLE READER SERVICE NO. **508**

THE BIG MAC MONITOR

The Big Mac Monitor reproduces any Macintosh display, including fine text and high-resolution graphics. Users can connect several monitors in series when multiple displays are required. Included with the Big Mac Monitor is the PDS External Video Card, which works with the monitor to provide high-resolution viewing. *(List Price: $1995)*

Requires: Macintosh

Professional Data Systems
20 Sunnyside Avenue
Mill Valley, CA 94941
(415) 383-5537

CIRCLE READER SERVICE NO. **509**

126-MEGABYTE OMNIDRIVE

Corvus Systems, Inc. has developed a 126-megabyte version of OmniDrive for Apple IIe computers. The new OmniDrive features a voice-coil motor instead of a stepper motor and has an access time of 30 milliseconds.

A complete 126-megabyte disk system, which includes a 126-megabyte OmniDrive, a Corvus transporter card, and Constellation II software, includes all the items you need to add 126 megabytes of hard-disk mass storage to your Apple computer and to create a basic Omninet local-area network. *(List Price: $9495)*

Requires: Apple IIe

Corvus Systems, Inc.
2029 O'Toole Avenue
San Jose, CA 95131
(408) 559-7000

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MOUSETRACER DRAWING AID

Mousetracer is a drafting/drawing aid that includes a specially designed mouse holder. Users can trace hard-copy graphics and artwork onto the computer screen when using a mouse-controlled graphics program.

Mousetracer is fully assembled and includes an instruction manual with 20 copyright-free drawings. *(List Price: $34.95)*

Requires: Apple IIe, IIc, or Macintosh

Village Computer Resources
P.O. Box 155
Lakewood, CA 90714
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HARDWARE/SOFTWARE

MEGAMAC

A memory upgrade for the Macintosh computer, MegaMac provides a full 1024K memory—512K of core memory and a 512K RAMdisk. The MegaMac board mounts inside the Macintosh and is fully compatible with all Macintosh software. Also available is a MegaRAM software package designed to work with the board. MegaMac is available as a complete system that includes the Macintosh computer. *(List Price: MegaMac, $1595 if exchanged for original 128K motherboard, or $1895; MegaRAM, $90; complete 1024K Macintosh system, $3790)*

MicroGraphics Images Corporation
19612 Kingsbury Street
Chatsworth, CA 91311
(818) 368-3482

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NEW PRODUCTS FROM PBI SOFTWARE

Serial Box, a printer adapter, enables the IIc to work with parallel printers. It is compatible with the Epson RX, MX, FX, Okidata, Gemini, Prowriter, C. Itoh, or Brother letter-quality printers and can interpret some graphics commands.

GraphWorks offers business-graphic capabilities for AppleWorks users. It is a stand-alone ProDOS Apple IIe and IIc program that utilizes the AppleWorks spreadsheet data files and plots them as four graph types: bar, stacked-bar, line, and pie. *(List Price: Serial Box, $89.95; GraphWorks, $79.95)*

Requires: Serial Box requires Apple IIc; GraphWorks requires Apple IIe or IIc

PBI Software
1155B-H Chess Drive
Foster City, CA 94404
(415) 349-8765

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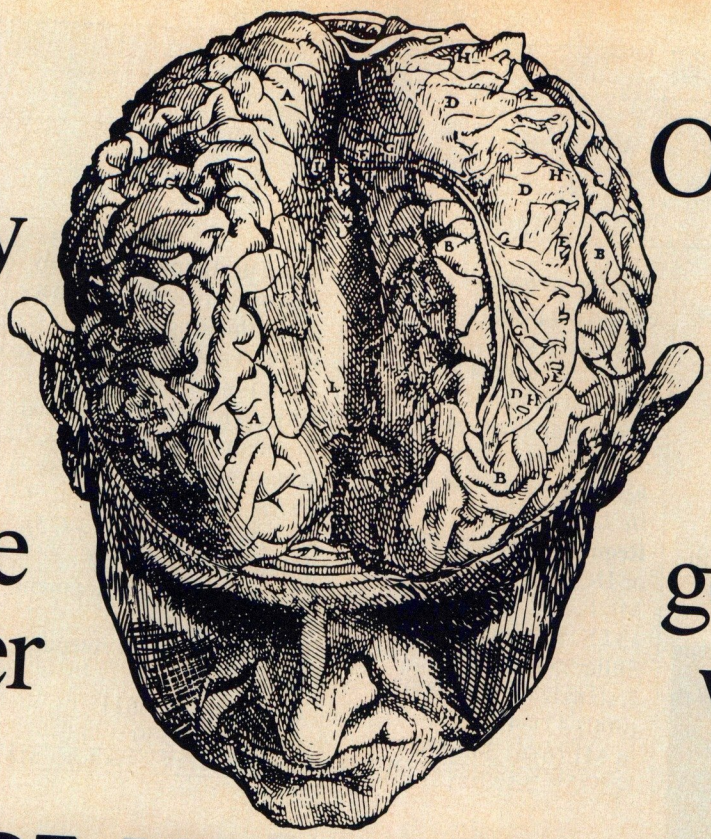

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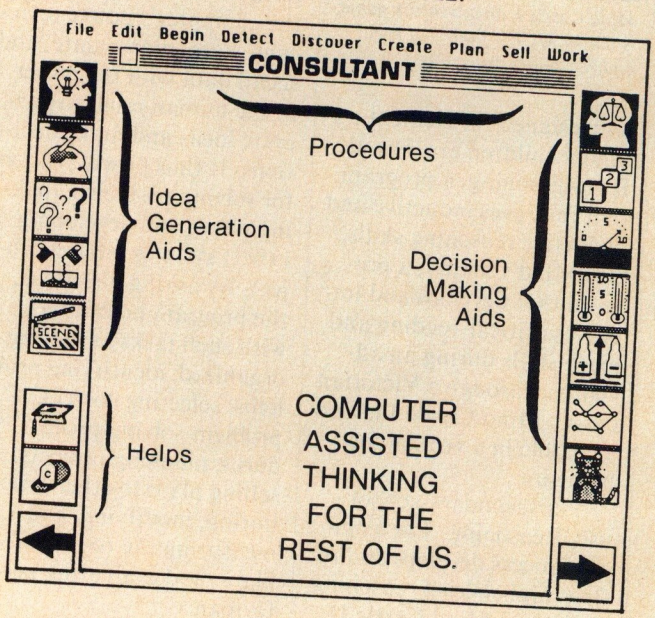

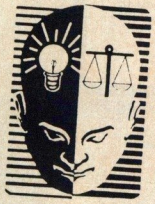

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SOFTWARE

II SERIES

MCE LOGIC AND REASONING PROGRAMS

MCE (Microcomputer Education Programs) has announced a complete family of logic and reasoning programs for school use.

Mind Castle I, an adventure game, is one of MCE's family of logic and reasoning programs.

Designed for elementary school children are The 4th R—Reasoning, a program that improves inductive and deductive reasoning skills, and Mind Castle I, a program that develops and improves critical-reading and math skills during an adventure through a Victorian castle. Mind Castle I is also available in a version for home use.

For secondary-school use, Reasoning: The Logical Process develops and refines higher-level reasoning skills, and Mind Castle II increases such skills during an adventure in a specter-filled castle.

The Lost R—Reasoning is a program designed to develop reasoning skills necessary for successful learning and daily living. It is suitable for secondary special-education purposes, presenting concepts at a secondary-school interest level but at an elementary reading and conceptual level. *(List Price: $44.95 each; home version of Mind Castle I, $39.95)*

Requires: Apple II Plus, IIe, or IIc

MCE, Inc.
157 S. Kalamazoo Mall
Suite 250
Kalamazoo, MI 49007
(800) 421-4157
in MI (616) 345-8681

CIRCLE READER SERVICE NO. **514**

MAC

MAC CONSULTANT

Organization Development Services (ODS) is offering a new program, Consultant, that is designed to enhance the power of the mind. Designed to run on the Macintosh, the software combines the computer's power to accept, store, manipulate, and recall data with the power of the human mind to generate ideas and make decisions. It thus provides a tool for solving problems, making plans, and developing expert systems on any subject. By asking questions, the program helps users with such tasks as getting organized; identifying problems; selecting correct problem-solving procedures; planning projects; selling plans to others; monitoring, modifying, and measuring the results of plans; and evaluating performance.

The company also runs seminars—Think & Work and Team Think & Work—which are designed for individuals and small groups, respectively. With the help of the Consultant software, the seminars train and motivate participants to apply creative, critical, and procedural thinking to their work. A service called Team Tank is also available to help a group work on a real problem or plan and make consensus decisions. *(List Price: Consultant, $200; 3-day public seminar, $475)*

Requires: Macintosh

Organization Development Services, Inc.
444 N. Michigan Avenue
Suite 3650
Chicago, IL 60611
(312) 774-6550

CIRCLE READER SERVICE NO. **515**

MAC

EXCEL NUMBER-PROCESSING TOOL

Excel is a powerful number-processing management tool that integrates a spreadsheet function, charting capabilities, a flexible spreadsheet-oriented database, a simple-to-use macro keystroke-saver facility, and the simplicity of the Macintosh interface.

Spreadsheet components include 256 columns by 16,384 rows; the ability to view and reference multiple worksheets on-screen; and the ability to name cell references, numbers, and mathematical expressions, which simplifies and helps organize model-building—for example, models that read Sales = Profit–Cost.

With integrated charting you can change numbers in spreadsheet windows, and the charts in separate windows are updated instantly. An on-screen gallery of 42 predesigned charts allows you to pick the right chart quickly.

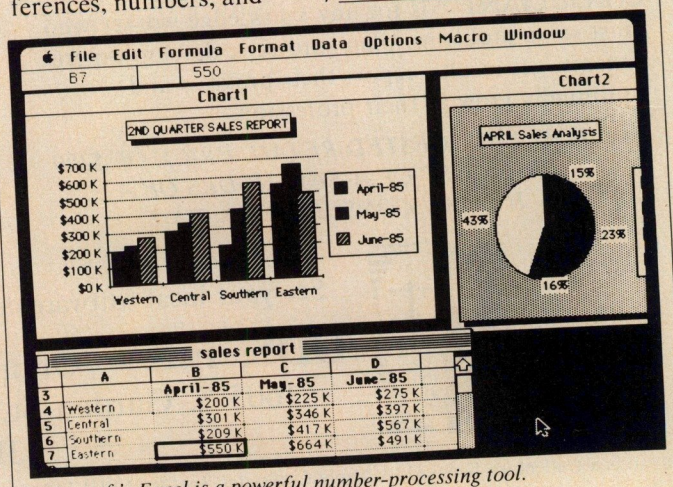
The spreadsheet-oriented database allows you to sort, extract, and display information quickly in a variety of ways.

The built-in keystroke-saving macros allow you to record commonly used sequences and play them back to save time. Advanced capabilities let you define your own mathematical functions. Available August 1, 1985. *(List Price: $395; with Mac Multiplan trade-up, $200; with Mac Multiplan and Chart trade-up, $100)*

Requires: Macintosh 512K or Macintosh XL; external disk drive recommended

Microsoft
10700 Northup Way
Bellevue, WA 98009
(206) 828-8088

CIRCLE READER SERVICE NO. **516**



Microsoft's Excel is a powerful number-processing tool.

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Macintosh

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Filevision	117.00
Hayden Ensemble	179.00
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Microsoft Basic	90.00
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Microsoft Multiplan	119.00
Microsoft Word	119.00
PFS: File Report Combo	117.00
Ready Set-Go	89.00
Sargon III	31.00
TK! Solver	149.00
Think Tank	81.00
Typing Tutor III	37.00

Entertainment

	Our Price
Seven Cities of Gold	28.00
Murder on the Zinderneuf	26.00
Archon II	28.00
Pinball Construction Set	26.00
One-On-One	28.00
Skyfox	28.00
Miner 2049'er or The Heist	25.00
Wizardry	31.00
Knight Of Diamonds	21.50
Legacy of Llylgamyn	25.00
Return Of Werdna	25.00
Rescue Raiders	22.00
Crypt of Medea	22.00
Wiziprint	16.00
The Quest or Ring Quest	21.80
Expedition Amazon, or Xyphus	21.80
Sword of Kadash	21.80
Millionaire, Squire, or Barron	31.00
Solo Flight or Nato Commander	23.00
Amazon or Dragon World	26.00
Fahrenheit 451 or Shadow Keep	26.00
Flight Simulator II	33.00
Championship Lode Runner	22.00
Choplifter! or Karateka	22.00
Pole Position or Zaxxon	20.00
Bruce Lee	25.00
Spy Hunter, Star Trek, or Tapper	28.00
Buck Rogers or Up 'n' Down	28.00
Kings Quest	31.00
Beyond Castle Wolfenstein	22.00
Ultima III: Exodus	35.00
Sargon III	31.00
Cutthroats, or Seastalker	25.00
Hitchhiker's Guide to The Galaxy	25.00
Deadline, or Starcross	31.00
Witness, Planetfall, or Enchantor	5.00
Infidel or Sorceror	28.00
Zork II, Zork III, or Suspect	28.00
Zork I	25.00
Objective Kursk	25.00
50 Mission Crush	25.00
War in Russia	49.00
Imperium Galactum	25.00
Reforger 88	37.00
Baltic 85	22.00
Questron	31.00
Broadsides	25.00
Geopolitique 1990	25.00
North Atlantic '86	37.00
Battle For Normandy	25.00
Carrier Force	37.00
Germany 1985	37.00
Gulliver's Travels by Windham	20.00
Wizard Of Oz by Windham	20.00

Hobby

	Our Price
Apple Mechanic	17.00
Beagle Basic	20.00
Beagle G.P.L.E.	28.00
Beagle Graphics	33.00
D-Code	23.00
Disk Quick	17.00
Dos Bos	14.00
Double Take	20.00
Fat Cat	20.00
Flex Text	17.00
Frame Up	17.00
I.O. Silver	17.00
Pronto Dos	17.00
Silicon Salad	14.00
Triple Dump	23.00
Typefaces	11.00
Utility City	17.00
Bag of Tricks	25.00
Applesoft Compiler (Microsoft)	109.00
Einstein Compiler	85.00
Compiler Plus (Hayden)	37.00
Lisa V2.6	55.00
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Merlin Assembler	39.00
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Pix-it	31.00
Take I	37.00
Blazing Paddles	31.00
Zoom Graphics	31.00
Sideways	37.00
Fontrix	44.00
Font Paks 1-11 ea.	13.00
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Blank Media

	Our Price
Elephant SS/DD (10)	12.50
BASF SS/DD (10)	15.50
Maxell SS/DD (10)	16.00
Verbatim SS/DD (10)	17.50
3M SS/DD (10)	18.00
Memorex SS/DD (10)	15.00
Dysan SS/DD (10)	23.00

Business

	Our Price
ADVANCED LOGIC SYSTEMS	
T-Maker	189.00
APPLE	
Access // (//e, //c)	59.00
Apple Works	199.00
Apple Writer // (//e, //c)	125.00
Quickfile (//e, //c)	79.00
APPLIED SOFTWARE TECHNOLOGY	
Versaform	55.00
ARTSCI	
MagiCalc	94.00
Magic Office System	185.00
Magic Window II	94.00
ASHTON TATE	
dBase II	279.00
BPI SYSTEMS (II+or //e)	
GA, AR, AP, PR or INV. ea.	235.00
CONTINENTAL SOFTWARE	
F.C.M./FL	61.00
G/L, A/R, A/P, Payroll ea.	145.00
Home Cataloger	31.00
CREATIVE PERIPHERALS	
Time Trax //e or //c	85.00
Time Trax //c Clock Only	55.00
DECISION SUPPORT	
The Business Accountant	152.00
DOW JONES SOFTWARE	
The Market Analyzer	209.00
The Market Manager	149.00
The Market Microscope	209.00
HAYDEN	
Pie Writer V2.2	95.00
The Writer	35.00
HOWARDSOFT	
Real Estate Analyzer II	155.00
Tax Preparer 1984	169.00
HUMAN EDGE SOFTWARE	
Communications Edge	119.00
Management Edge	149.00
Mind Prober	31.00
Sales Edge	149.00
KENSINGTON MICROWARE	
Format II Enhanced	92.00
LIVING VIDEOTEXT	
Think Tank II+ or //e	88.00
MEGAHAUS	
MegaFinder	99.00
MegaSpell	39.00
MegaWorks	78.00
MegaWriter	65.00
MICROPRO	
Calcstar	49.00
Infostar w/Z-Card	120.00
Wordstar w/Z-Card	169.00
Wordstar Pro w/Z-Card	229.00
PRACTICORP	
Practicalc II	34.00
MICROSOFT	
Microsoft Softcard w/dBase II	329.00
Multiplan	62.00
QUARK	
Word Juggler & Lexicheck	119.00
SENSIBLE SOFTWARE	
Bookends	74.00
Graphics Department	78.00
Report Card	37.00
The Sensible Speller	74.00
SIERRA ON-LINE	
The General Manager II	132.00
The Screenwriter //e	78.00
SILICON VALLEY	
List Handler (II+, //e, //c)	48.00
The Handlers (II+, //e, //c)	103.00
Word Handler II (II+, //e, //c)	48.00
SMITH MICRO SOFTWARE	
Stock Portfolio System	75.00
SOFTWARE ARTS	
TK! Solver	179.00
The VisiCalc Package	115.00
SOFTWARE PUBLISHING	
PFS: File	73.00
PFS: Graph	73.00
PFS: Report	73.00
PFS: Write (//e, //c)	73.00
PFS: Proof (//e, //c)	43.00
PFS: Access (//e, //c)	43.00
STONEWARE	
DB Master Business Team	219.00
DB Master Business Writer	98.00
DB Master Version Four Plus	185.00
DB Master (Corvus)	249.00
VISICORP	
Flashcalc II+, //e, //c	62.00
Visitrend/Visiplot	62.00

Educational Software

	Our Price
APPLE	
Apple Logo // (//e, //c)	82.00
BARON'S	
Computer SAT	54.00
GMAT	54.00
CBS	
Career Planning	55.00
Coast To Coast	28.00
Goren's Bridge	49.00
Mastering the SAT	93.00
Micro Speed Reading	78.00
Success w/Math (ea.)	15.50
DAVIDSON & ASSOCIATES	
Classmate	30.00
Math Blaster	30.00
Speed Reader II	42.00
Speed Reader Data A,B,C, or D	15.00
Spell-It	30.00
Word Attack!	30.00
DESIGNWARE	
Grammer Examiner	28.00
Math Maze	24.00
Mission Algebra	28.00
Spellagraph	24.00
Spellakazam	19.00
The Body Transparent	28.00
DLM	
Alligator Mix	21.00
Alphabet Circus	19.00
Demolition Division	21.00
Number Farm	19.00
Spelling Wiz	21.00
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Algebra 1, 2, 3, or 4	23.00
Algebra 5 or 6	28.00
Compu-Read	17.00
Compu-Math: Arithmetic Skills	29.00
Hands-on BASIC Programming	32.00
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PSAT Word Attack Skills	18.00
SAT Word Attack Skills	18.00
Spelling Bee w/Reading Primer	23.00
Writing Skills 1,2,3 or 4	25.00
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Einstein Memory Trainer	55.00
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Computer SAT	48.00
IMAGE	
Crime & Punishment	25.00
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Adventure in Flesh	39.00
Krell Logo	65.00
Krell SAT – Gold	225.00
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Bumble Plot	24.50
Gertrude's Puzzles	27.50
Juggle's Rainbow	18.75
Magic Spell	22.00
Reader Rabbit	24.50
Robot Odyssey I	30.50
Rocky's Boots	30.50
Word Spinner	22.00
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Mastertype's Writing Wizard	49.00
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Accessories

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Applied Engineering Cards	Call
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Hayes 300 Baud Smartmodem	139.00
Hayes 1200 Baud Smartmodem	399.00
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Novation 212 Apple Cat II	375.00
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Pro Model 1200A (Internal)	Call
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Zoom /Modem //e Plus	159.00
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Microsoft Premium Softcard //e	259.00
Microsoft Softcard II	239.00
Extend 80 (Carib. Computer)	115.00
MCT Speed Demon	219.00
Saturn 128K Ram	199.00
Neptune 80 Col. 64K Card	185.00
Accelerator //e	239.00
Videx Videoterm w/SS Inv.	179.00
Videx Ultraterm	245.00
Corvus Hard Disks	Call
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Mockingboard C Board	135.00
Mockingboard D Board (//c)	135.00
Echo II Plus	95.00
The Cricket (//c)	120.00
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Hayes Mach II Joystick //e	29.00
Hayes Mach III Joystick //e	35.00
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Apple Super Serial Card	125.00
SeriAll Interface Card	129.00
Serial Grappler Plus	85.00
Pkaso/U Interface	119.00
Grappler +	85.00
Buffered Grappler +	149.00
Nice Print (Spies Labs)	125.00
Finger Print Plus	99.00
Print-It	135.00
Thunderclock +	109.00
Digital Paintbrush System	175.00
Muppet Learning Keys	45.00
Koala Pad	75.00
Key Tronic Keyboard	245.00
Trackhouse Key Pad	110.00

Printers

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ImageWriter	495.00
ImageWriter (Wide Carriage)	565.00
Scribe Printer	239.00
BROTHER	
HR-35	849.00
CITIZEN	
MSP-10 (160 cps)	339.00
MSP-15 (160 cps)	519.00
MSP-20 (200 cps)	479.00
MSP-25 (200 cps)	649.00
DYNAX	
DX-15XL	379.00
EPSON	
FX-80 +	Call
FX-100 +	Call
RX-80 F/T +	Call
RX-100	Call
LQ-1500	Call
JX-80	Call
LX-80	Call
JUKI	
6100	399.00
6300	769.00
OKIDATA	
Microline 82A	309.00
Microline 83A	579.00
Microline 92S //c/Mac/Lisa	429.00
Microline 92P	359.00
Microline 93P	599.00
Microline 84P	669.00
PANASONIC	
KXP-1090	209.00
KXP-1091	299.00
KXP-1092	399.00
KXP-1093	579.00
PROWRITER (C. Itoh)	
ProWriter 8510 AP	299.00
ProWriter 1550 AP	449.00
ProWriter 7500 AP	219.00
StarWriter A10-30P	479.00
StarWriter F10-40P	869.00
SILVER REED	
EXP-400P	249.00
EXP-500P	309.00
EXP-550P	329.00
EXP-770P	759.00
STAR MICRONICS	
SG-10 (120 cps)	235.00
SG-15 (120 cps)	395.00
SD-10 (160 cps)	349.00
SD-15 (160 cps)	469.00
SR-10 (200 cps)	499.00
SR-15 (200 cps)	609.00
Powertype	329.00
TOSHIBA	
P-1340	599.00
P-1351	1225.00

Disk Drives

	Our Price
APPLE	
Disk II Drive	299.00
Duo Disc w/Acc. Kit	639.00
ProFile (5 Meg) w/Acc. Kit	1135.00
ProFile (10 Meg) w/Acc. Kit	1599.00
Apple //c External Drive	269.00
Macintosh External Drive	399.00
MICRO SCI	
Slimline //e	185.00
Slimline //c	189.00
Micro Sci C2 Controller	59.00
RANA	
Elite I	195.00
Elite II	339.00
Elite III	399.00
Rana Disk Controller	79.00
REMINGTON RAND	
Model 3200 Drive //, //c, //e	Call
QUARK	
QC-10 Hard Disc //e, //c, Mac	1425.00

Monitors

	Our Price
AMDEK	
Color 300 (Composite)	239.00
Color 600 (RGB)	419.00
Video 300G Green	125.00
Video 300A Amber	130.00
PANASONIC	
Hi—Res Green	119.00
Hi—Res Amber	125.00
10" Dual Mode Comp. Color	189.00
TEKNICA	
MJ-22 RGB Color	325.00
SANYO	
DM 2112 Green Monitor	85.00
DM 2212 Amber Monitor	85.00
DMC 5500 Color Comp.	245.00
DMC 6500 GR/RGB Color	285.00
TAXAN	
RGB Vision III (Hi-Res)	379.00
210 12" Color (Lo-Res)	264.00
Green (Hi-Res)	120.00
Amber (Hi-Res)	130.00
410-64 RGB-2 Interface	185.00

Home

	Our Price
Home Accountant	43.00
Dollars and Sense (II+, //e)	60.00
Dollars and Sense (//c)	71.00
Monogram Forecast	39.00
The Accountant	60.00
Time is Money	52.00
Money Street	75.00
Networth	48.00
Financial Cookbook	35.00
Cut and Paste	26.00
The Write Choice	27.00
Bank Street Writer	42.00
Bank Street Speller	42.00
Homeword	43.00
Homeword Speller	31.00
Homeword Filer	43.00
ASCII Express Professional	79.00
Softerm II	128.00
Compuserve Starter Kit	25.00
Typing Tutor II	15.80
Typing Tutor III	31.00
Master Type	25.00
Crossword Magic (Mindscape)	37.00
Micro Cookbook (II+, //e)	23.00
Music Construction Set	28.00
Print Shop	29.00
Print Shop Graphics Library	16.00
Turbo Pascal	33.00
Verbatim Drive Analyzer	24.00
Gibson Light Pen	159.00

VISA

MasterCard

For fast delivery send cashier's check, certified check or money order. Personal and company checks allow 3 weeks to clear. Shipping - Software ($2.50 min.) C.O.D. add an additional $1.90. Shipping - Hardware (please call). Alaska, Hawaii, Canada, PO, APO and FPO $5.00 min. Foreign orders - $15.00 min. and 15% of all orders over $100. Mastercard & Visa (include card # and expiration date). Connecticut residents add 7.5% sales tax. We ship same day for most orders. PRICES SUBJECT TO CHANGE WITHOUT NOTICE. All returns must have a return authorization number. Call 203-378-3662 to obtain one before returning goods for replacement. NOT RESPONSIBLE FOR TYPOGRAPHICAL ERRORS.
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Advertisement prepared April 1, 1984

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Beast War ... $19
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Legionnaire ... $21
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Baron ... $32
Millionaire ... $32
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These Titles Available for MAC ... $37 Ea
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Bank St. Filer (128K) ... $43
Bank St. Mailer (64K) ... $43
Bank St. Mailer (128K) ... $43
Bank St Writer ... $43
Bank St Writer (128K) ... $43
Bank St Speller ... $43
Cyborg (MAC) ... $25
Dazzle Draw (128K) ... $39
Karateka ... $23
Print Shop ... $33
Print Shop Graphics Library ... $19
Print Shop Paper Refill ... $14
Science Tool Kit ... $39
CBS
Adventure Master ... $29
Algebra Series ... Call
America Coast To Coast ... $25
Charles Goren Bridge ... $49
Dinosaur Dig ... $25
Dr. Seuss ... $21
Felony ... $21
Mastering the SAT ... $67
Math Series ... Call
Murder by Dozen ... $23
Sea Voyagers ... $25
CONTINENTAL
Book of Adv. Games ... $16
Home Accountant ... $44
Home Accountant (128K IIe & IIc) ... $44
Home Accountant (MAC) ... $67
DATASOFT
Bruce Lee ... $23
Conan ... $25
Dallas Quest ... $21
Pac Man ... $17
Sands of Egypt ... $17
Zaxxon ... $17
DAVIDSON
Math Blaster ... $33
Speed Reader II ... $43
Spell It ... $33
Word Attack ... $33
ELECTRONIC ARTS
Archon II ... $27
Cut & Paste WP ... $35
Financial Cookbook ... $35
Music Construction Set ... $27
One-on-One ... $27
Pinball Construction Set ... $27
Seven Cities of Gold ... $27
EPYX
Impossible Mission ... $23
Pitstop II ... $25
Summer Games ... $25
Temple of Apshai ... $19
FISHER PRICE
Alpha Build ... $16
Logic Levels ... $16
Up & Add Em ... $16
HAYDEN
Ensemble (MAC) ... $179
Holy Grail ... Call
Holy Grail (MAC) ... Call
Musicworks (MAC) ... $49
SAT (MAC) ... $67
Sargon II ... $16
Sargon III ... $33
Sargon III (MAC) ... $33
Videoworks (MAC) ... $49
Word Challenge II (MAC) ... $25
INFOCOM
Cut Throats ... $25
Deadline ... $33
Enchanter ... $25
Hitchhiker's Guide to the Galaxy ... $25
Infidel ... $29
Planetfall ... $25
Sorcerer ... $29
Suspect ... $29
Witness ... $25
Zork I ... $25
*All titles available for Macintosh at prices listed above
KOALA
Gibson Light Pen ... $149
Muppet Learning Keys (IIe &IIc) ... $49
MacVision ... $249
Tablet w/Painter (IIc) ... $75
LEARNING COMPANY
Addition Magician ... $23
Gertrudes Secrets ... $27
Juggles Rainbow ... $19
Number Stumper ... $25
Reader Rabbit ... $25
Robot Odyssey I ... $33
Word Spinner ... $23
MICROLAB
Death in Caribbean ... $23
Dino Eggs ... $16
Short Circuit ... $16
MICROPROSE
F-15 Strike Eagle ... $23
Nato Commander ... $23
Solo Flight ... $23
MINDSCAPE
Bank St. Story Book ... $26
Crossword Magic ... $33
Mr. Pixel's Cartoon Kit ... $23
Mr. Pixel's Programming Paint Set ... $23
MONOGRAM
Dollars & Sense ... $67
Dollars & Sense (IIc) ... $77
Dollars & Sense(MAC) ... $95
MUSE
Beyond Wolfenstein ... $23
Castle Wolfenstein ... $19
ORIGIN
Ultima III ... $39
PRACTICORP
Practicalc II ... $35
PROFESSIONAL SOFTWARE
Trivia Fever ... $25
Trivia Fever (MAC) ... $25
Trivia Fever Super Sports ... $19
RANDOM HOUSE
Charlie Brown's ABC's ... $25
Peanuts Maze Marathon ... $25
Snoopy's Reading Machine ... $25
SCARBOROUGH
Boston Computer Diet ... $49
Build A Book ... $26
Masterytype ... $25
Masterytype (MAC) ... $29
Make Millions (MAC) ... $33
Net Worth ... $49
SIERRA ON LINE
Homeword ... $43
Homeword w/Speller ... $67
Kings Quest (128K) ... $33
Ultima II ... $39
Ultima II (MAC) ... $39
SIMON & SCHUSTER
Gonzo in Wordrider ... $23
Kermit's Electronic Storymaker ... $23
NY Times Crossword Puzzles 1 ... $16
NY Times Crossword Puzzle 2 ... $16
Typing Tutor III ... $33
Typing Tutor III (MAC) ... $39
SPINNAKER
Alphabet Zoo ... $19
Counting Parade ... $19
Facemaker ... $17
Fraction Fever ... $17
Kidwriter ... $19
Kids on Keys ... $17
Kinder Comp ... $17
Story Machine ... $17
Trains ... $19
SPRINGBOARD
Early Games ... $23
Easy as ABC ... $25
Fraction Factory ... $19
Mask Parade ... $25
Newsroom ... $33
Stickers ... $23
SSI
Battle Normandy ... $25
Carrier Force ... $39
Computer Ambush ... $39
Computer Baseball ... $25
Computer QB ... $25
Galactic Adventures ... $39
Germany 1985 ... $39
Pro Tour Golf ... $25
Questron ... $33
Rails West ... $25
War In Russia ... $53
SUBLOGIC
Flight Simulator II ... $33
TELARIUM
Amazon ... $25
Fahrenheit 451 ... $25
Rendezvous w/Rama ... $25
TIMEWORKS
Evelyn Wood Dynamic Reader ... $47
ACCESSORIES
Anchor Modems ... Call
BASF SS.DD ... $14 Bx
BASF DS.DD ... $19 Bx
Compuserve Starter Kit (5hrs) ... $23 ... 2/39
Disk Case (Holds 50) ... $9
Disk Drive Cleaner ... $9
Dow Jones News Retrieval Kit (5hrs) ... $21
Rana Elite One ... $187
Sakata 13" Color Monitor ... Call

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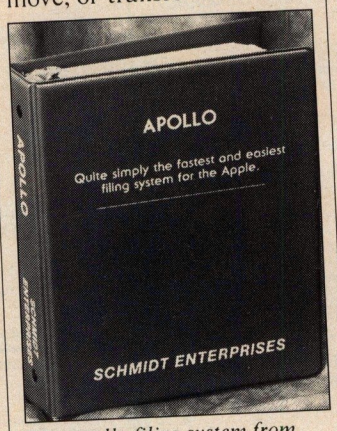
SERIES

APOLLO FILING SYSTEM

A fast and easy-to-use filing system, Apollo also has database, spreadsheet, and form-generation abilities. The program's file form can be of any length and can have any number of fields. Users can retrieve, print, remove, or transfer files or



The Apollo filing system from Schmidt Enterprises

groups of files almost instantaneously. Any field can contain a formula, and files can be sorted alphabetically by any field, in either ascending or descending order. The program has an on-screen Help menu and comes with a manual, tutorial, and sample data disk. *(List Price: $120)*

Requires: Apple II, II Plus, IIe, or IIc; 48K RAM; one disk drive

Schmidt Enterprises
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Van Nuys, CA 91406
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CIRCLE READER SERVICE NO. **522**

SERIES

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The flight simulator Solo Flight is now available in a version for Apple II computers. The program features 3-D graphics and is suitable for both novice and expert pilots. It provides realistic takeoffs, landings, and navigation under both visual and instrument flight rules among 21 different airports. Simulation options include touch-and-go landings, full cockpit instrumentation, dual VOR navigation radios, instrument landing system (ILS), multiple air-navigation maps, and emergency-procedure practice. *(List Price: $34.95)*

Requires: Apple II, II Plus, IIe, or IIc

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TurboCharger increases the speed of the Macintosh's floppy-disk access by keeping critical areas of the disk in RAM. When installed on a Macintosh 512 start-up disk, TurboCharger software works automatically. As the system's use progresses, the software analyzes disk usage and buffers critical areas of the disk in RAM to increase performance.

TurboCharger works with copy-protected software and with large programs. It is compatible with many Macintosh software programs including MacWrite, MacPaint, Multiplan, Chart, and Word. *(List Price: $95)*

Requires: Macintosh 512

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The Newsroom lets you design and print your own newspaper.

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Requires: Apple IIe

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- △ Using the idea of recursion—making a simple command repeat itself to perform more complex functions
- △ Experimenting with words and sentences

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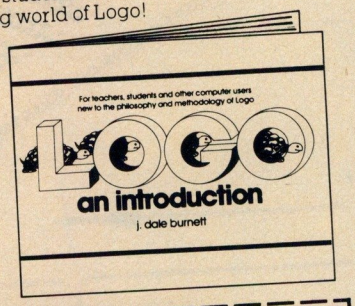

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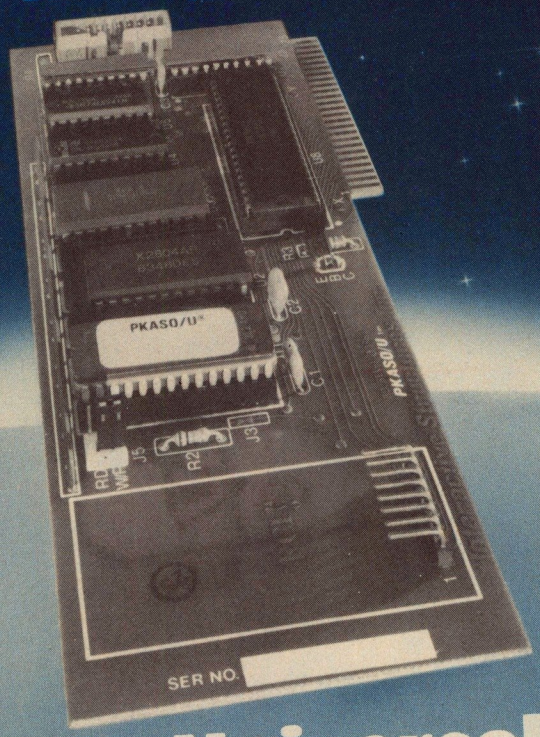

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Introducing The Apple Computer Clubs Activities Handbook, Winning Programs, and Parents' Guide

For centuries, the apple has made history. Adam and Eve bit into one, and look what they learned! A certain William Tell thought apples were good for target practice. Isaac Newton had a better idea: a bonk from an apple helped him figure out gravity.

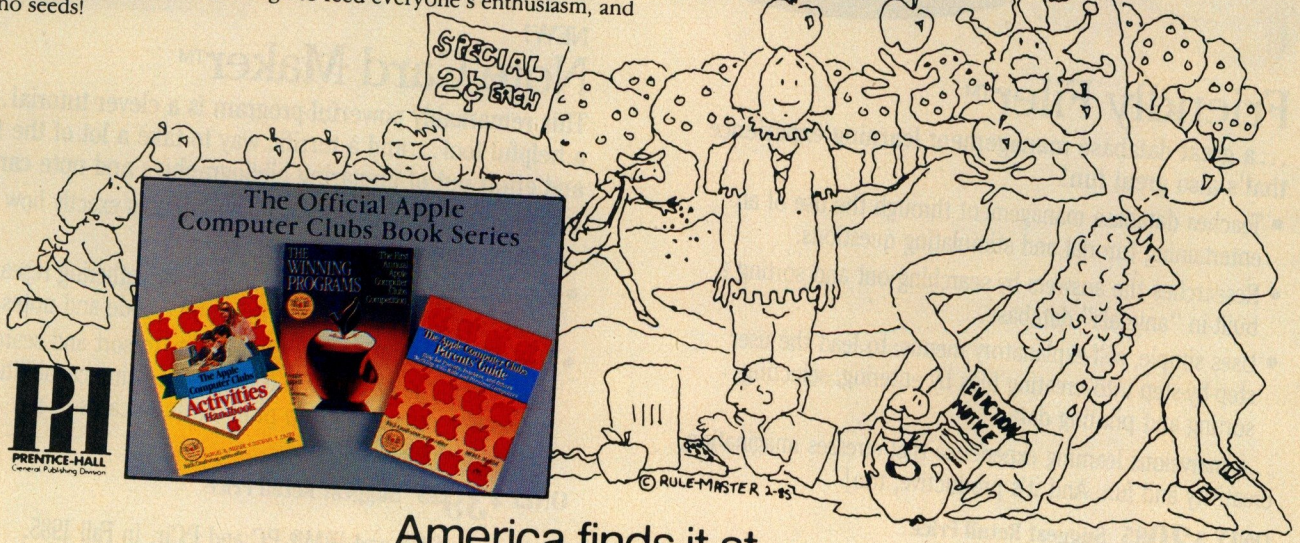
Today's most famous apples aren't round red fruits—they're blinking, humming computers. These Apples can turn out some amazing things—even help *you* make a little history.

Hey, there's no reason a computer couldn't bake an apple pie if you programmed it to turn on the food processor and open the oven door. But we've all had more experience doing things with apples than with Apples. To really make your Apple cook, you need high-tech know-how AND direction. Having a few books handy could really help.

Fortunately, another step forward in apple history has just been made: the fact-packed activity handbooks you need are here. They're the Apple Computer Clubs Handbooks, and they let you (and adults) in on Apple computer everything! From fundamentals to innovations that whet your imagination.

There's a chunk of information about the Apple. So you can investigate its inner workings. Give it proper care and feeding. Exterminate the bugs that crash programs.

There are bushels of ideas for *you*—along with programs, projects, and tips for "Apple-cations" you may never have dreamed of. Like using the Apple to • test for ESP • review for that geography test • invent an adventure game • talk to friends across town through your keyboard • tutor a tyke • you name it. There's more about new languages, graphics, life in the computer world, contests . . . enough to feed everyone's enthusiasm, and look—no seeds!



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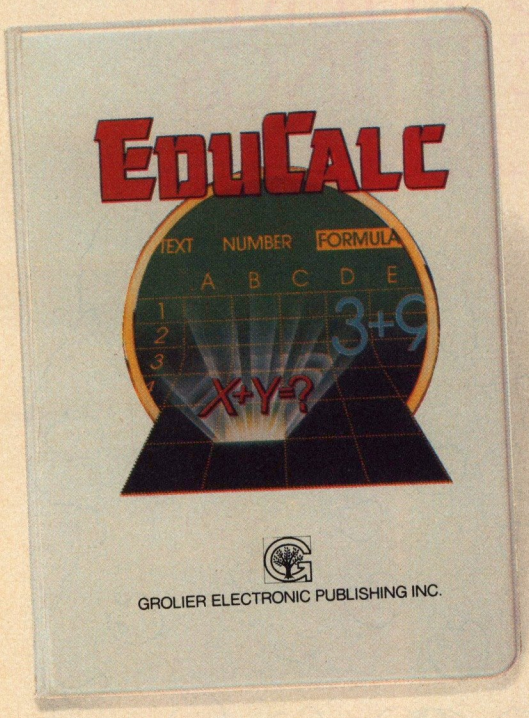

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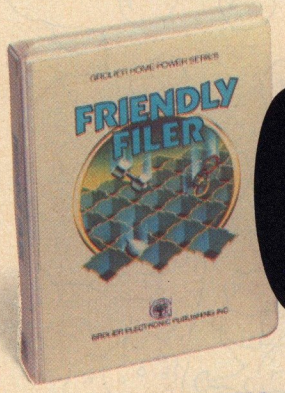

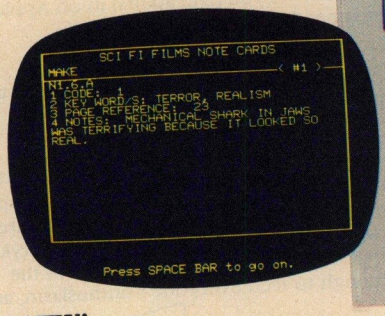

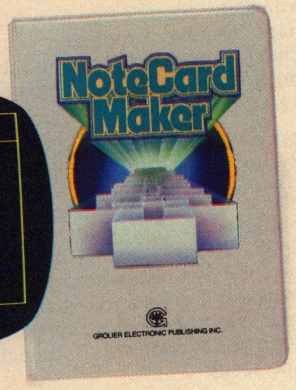

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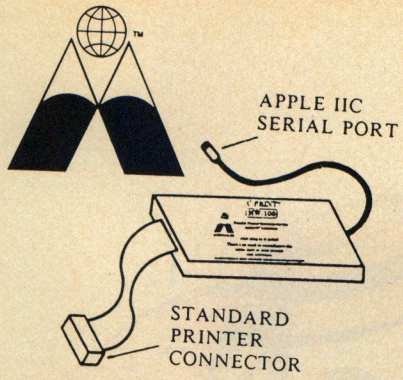

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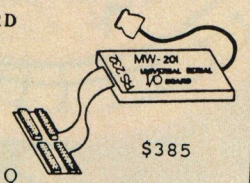

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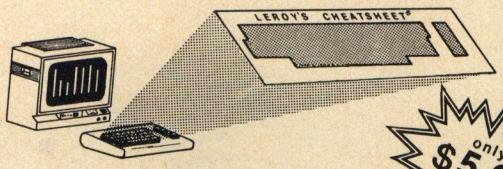

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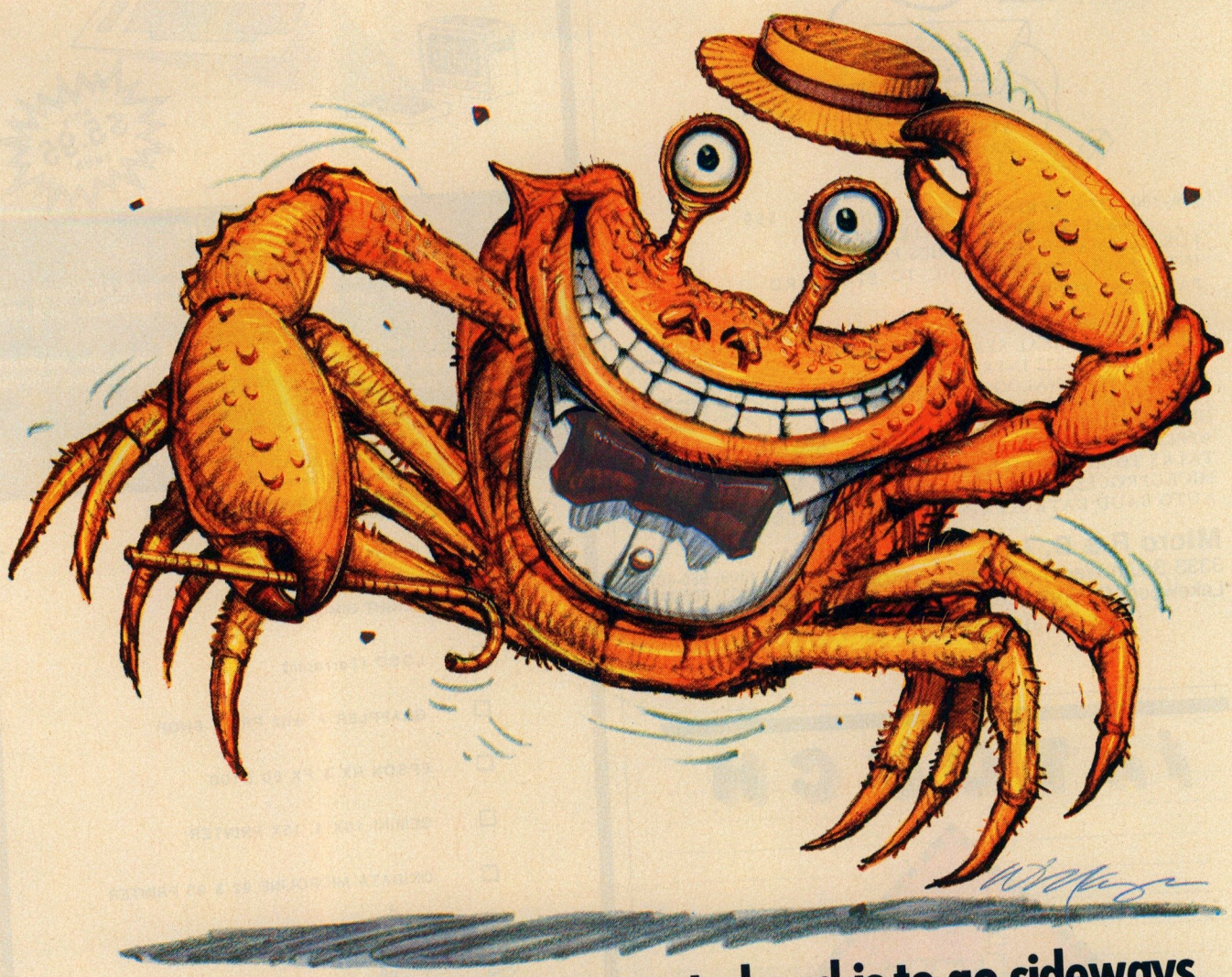

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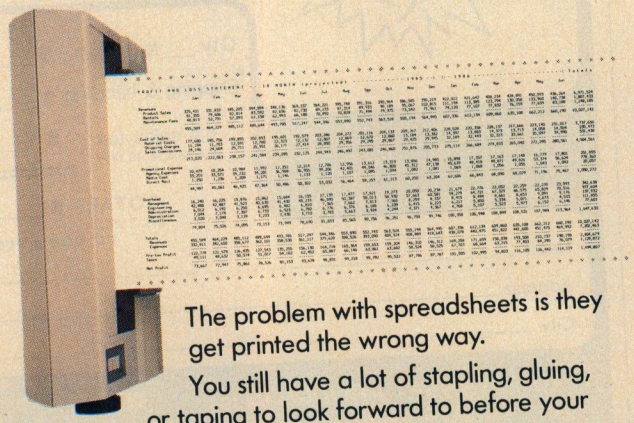

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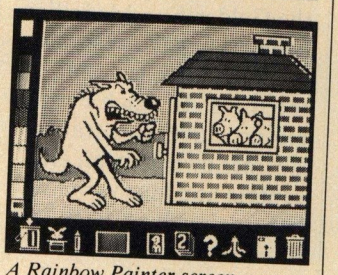

A Rainbow Painter screen

MAC

▶ P/C PRIVACY FOR MACINTOSH

Encryption software called P/C Privacy: Personal/Confidential is now available in a version that meets Macintosh standards. The program encrypts files from MacWrite, MacPaint, and other programs, creating ASCII files and so offering users privacy on their disks or over electronic mail. Users control the encryption process by using a keyword that can exceed 100 characters and which they can change at any time. Decryption restores all original file characteristics including charts, graphs, and fonts. Users can telecommunicate encrypted files. *(List Price: $140)*

Requires: Macintosh

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II SERIES MAC

HAYDEN SOFTWARE GAMES

Several new games are now available from Hayden Software. Three interactive-fiction adventures—The Holy Grail, Inca, and the Computer Novel Construction Set—are the first offerings in the TimeQuest Adventure series, in which players participate in an adventure where events occur and characters move independently of player action.

In the Holy Grail, the player is the central character in a search for the legendary goblet used during The Last Supper. The game, however, is set in medieval times, and players encounter knights, kings, and countrymen; do battle with a fierce dragon; rescue a fair princess; and more.

In Inca, players must find the missing jewel from the Golden Sun Medallion, believed to have been worn by Atahualpa, last king of the Incas. To reach Peru, players travel on a tramp steamer owned by an evil captain and face various hazards, such as shark-infested waters, steamy jungles, and native headhunters. They must also solve six ancient Incan puzzles.

The Computer Novel Construction Set is a do-it-yourself tool kit that provides a framework that players can use to write their own adventure games.

The Holy Grail

Using menus and windows, players can create landscapes, room descriptions, travel paths, characters, and real-time events.

Hayden has also added Perplexx, a Scrabble-like word game, to its Hayden Classics series of computer versions of board games. To play Perplexx, you compete against LEXX, the program's 90,000-word lexicon, to build words that intersect horizontally or vertically with words already on the screen's board. The game offers eight levels of difficulty. *(List Price: TimeQuest Adventures, $49.95 each; Perplexx, $39.95)*

Requires: Holy Grail, Inca, and Construction Set—Apple IIe or IIc, 128K RAM; Perplexx—Macintosh

Hayden Software Company, Inc.
600 Suffolk Street
Lowell, MA 01854
(617) 937-0200

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Memo to Apple® users

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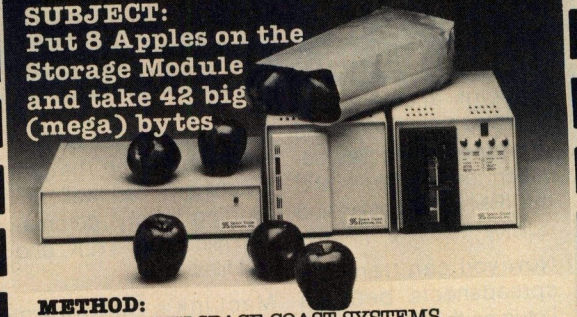

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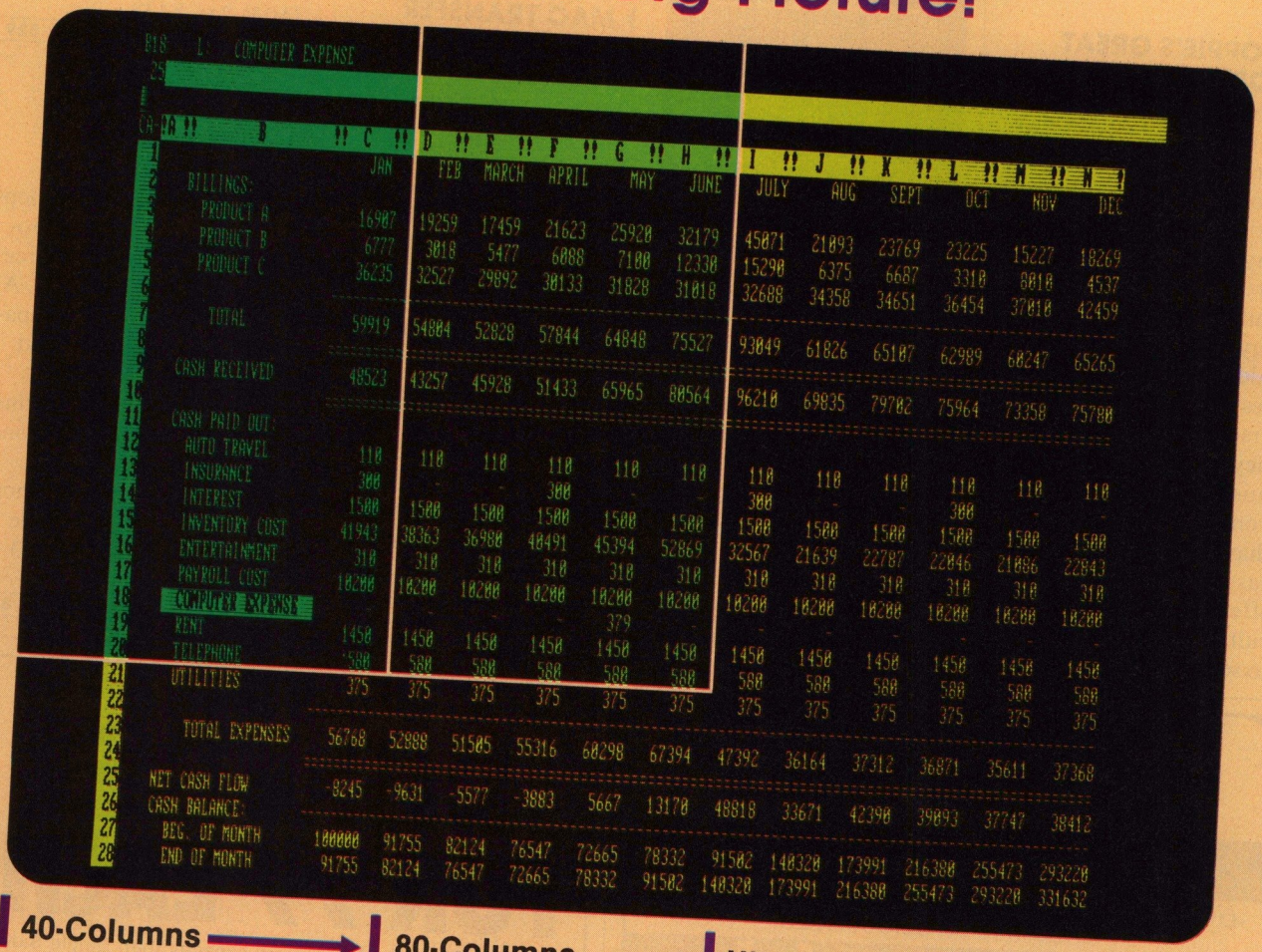

40-Columns → **80-Columns** → **UltraTerm** →

What you see is what you get. It's an old saying, but never more true than with the limited screen displays of most computers. Too often we have to continually jump back and forth to see all the information we are working with. UltraTerm solves this problem.

UltraTerm is the best video card for the Apple IIe and standard Apple computers. Eight different screen formats allow you to tailor the display to your needs. From the 128 column by 32 rows shown above (ideal for spreadsheets), to 80 columns by 48 rows, or even 160 columns by 24 rows, UltraTerm expands your view.

Best of all, the UltraTerm is fully compatible with the Videoterm, the best selling and most widely supported 80-column card for standard Apple computers. UltraTerm is supported by many popular programs. MultiPlan, Word Juggler IIe, WordStar, FlashCalc, and SuperCalc are just a few of the programs that support UltraTerm. Additionally, with optional pre-boots, AppleWorks, VisiCalc, and AppleWriter II can be used as well.

UltraTerm is now available in two forms: one for standard video monitors such as the Apple monitor II, and another with easy-on-the-eyes high quality character set for monitors that support interlace video (with high persistence phosphor).

UltraTerm for standard video monitors
New Low Price—$299.00
High Quality Display UltraTerm

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Videx INC. TM

1105 NE Circle Blvd., Corvallis, OR 97330
503-758-0521

CIRCLE 142 ON READER SERVICE CARD

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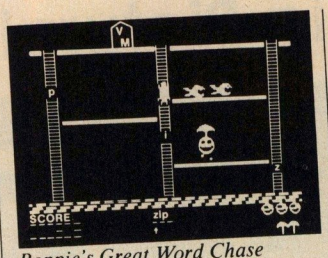
BOPPIE'S GREAT WORD CHASE

Boppie's Great Word Chase is an arcade-type game of word recognition, word creation, and spelling that is designed for one or two players. The program features Boppie, a roly-poly smiling character, whom players move up and down ladders and around obstacles in order to gather letters and build words. While they gather letters, players must also protect Boppie from the "snappers" that chase him. The program has 256 words built in and offers eight levels of difficulty. Options allow players to select speed of play,



Boppie's Great Word Chase

sound, and on-screen instructions, and an editing option allows them to create up to 32 words at each level of play. *(List Price: $29.95)*
Requires: Apple II Plus, IIe, or IIc; 64K RAM; one disk drive
DLM, Inc.
One DLM Park
Allen, TX 75002
(800) 527-4747
in TX (800) 442-4711
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Southeastern Software offers a custom service that transfers VisiCalc spreadsheet templates to Macintosh Multiplan, preserving all formulas and references from the original. This service eliminates rekeying the data into Multiplan.

Another service transfers all fields and records from databases created with AppleWorks to Microsoft File on the Macintosh.

The number of files to be transferred and the length of each file determines the cost of each service.
Requires: Macintosh
Southeastern Software
7743 Briarwood Drive
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(504) 246-8438
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SUBJECT-VERB AGREEMENT

Microcomputer Workshops has announced a new program, Subject-Verb Agreement, for use in schools. A free backup disk accompanies each disk purchased. *(List Price: $49.95)*
Requires: Apple II, II Plus, IIe, or IIc; 48K RAM; one disk drive
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For over 3 years, VersaForm has been used by manufacturers, bankers, doctors, farmers, and many others. It's THE program for serious business tasks such as invoicing, inventory, and purchasing — in fact, for whatever you've been doing using paper forms and ledgers.

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MAC

▸ SOFTFORMS FOR THE MAC

Artsci has released a form-generating program for use with the Macintosh computer and MacPaint. SoftForms can produce 22 forms, either customized with corporate logos or individually personalized, that are suitable for both business and personal use. The package includes the following forms: Employment Application, Weekly Reminder, Customer Invoice, Time and Materials Invoice, Monthly Calendar, Things-to-Do List, Credit Application, Payment Reminder, Call Report, Speed Memo, Inventory Report Form, Receiving Record, Credit Card Recordkeeper, Bank Account Recordkeeper, Balance Checkbook Form, SpeedGram, and three-column accounting and graph paper. *(List Price: $39.95)*

Requires: Macintosh

Artsci, Inc.
5547 Satsuma Avenue
North Hollywood, CA 91601
(818) 985-5763

CIRCLE READER SERVICE NO. **542**

MAC

▸ EPSTART VERSION 2.0

Epstart 2.0, a new version of the Macintosh-system-file printer controller, supports Epson MX-, RX-, LX-, and LQ-series printers, as well as the FX- and JX-series the previous version supported. It produces text and graphics from all applications that follow Macintosh printing standards, including MacPaint, MacWrite, Multiplan, and Microsoft BASIC. Single-color printing on the JX-80 color printer and letter-quality printing on the LQ-1500 are available through the Print Adjustment Accessory, included with Epstart. This accessory allows users to add extra density to Macintosh high-quality printing and also provides access to special features available on some Epson printers. *(List Price: $45)*

Epstart Version 2.0, a new printer controller for the Macintosh from SoftStyle, Inc.

Requires: Macintosh

SoftStyle, Inc.
7192 Kalanianaole Highway, Suite 205
Honolulu, HI 96825
(808) 396-6368

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For further information contact your computer dealer/distributor or: **TELEMAX, Inc.**
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Switchplate	$30.00

Monitor connector, wired to cable: $15.00

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Chipmaster IC Tester Interface card. MOD. ICT-2. Tests 14, 16, 18, 20 pin devices. Displays results on video monitor. Card plugs into any slot. Comes with test socket, software diskette, instructions. Ideal for service shops, labs, schools.
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CIRCLE 350 ON READER SERVICE CARD

What every Apple II+ and IIe user should ask before buying the "Sider" 10 MB hard disk:

When a company offers a superior quality 10 megabyte Winchester hard disk for only $695, it's bound to raise a few eyebrows... and a lot of questions. The fact is, you're probably already wondering "Can I really get a 10 megabyte hard disk that's *reliable* for only $695?" The answer is: ABSOLUTELY...when you choose the Sider from First Class Peripherals.

What's so great about the Sider?

For starters, the Sider lets you boot your ***Apple II+*** or ***IIe*** directly off the hard disk—unlike some other Winchester subsystems. Rebooting is also trouble-free. And the disk is partitionable, allowing you to allocate space to four operating systems on the same disk. The Sider supports: Apple DOS 3.3; Pro DOS™; Apple Pascal; and CP/M®

What's more, a small "footprint" lets you incorporate the compact Sider into your existing computer set-up with ease.

In addition, with the Sider, you not only pay far less for the subsystem, you also save money on installation. Because, unlike other 10 MB systems that require the purchase of expensive "extras," the Sider is *plug and play*. Everything you need is provided, including cables, host adaptor, installation software and manual.

What makes it so reliable?

To start, the Sider is manufactured, and sold exclusively, by First Class Peripherals, an innovative computer company which is backed by Xebec. The computer industry's leading manufacturer of disk controllers, Xebec has over a decade of experience serving customers like IBM, Toshiba, Texas Instruments and Hewlett Packard. It's this kind of expertise that helps assure the Sider's performance.

Special design features further enhance reliability. The Sider's controller is the field-proven, industry standard Xebec S1410A. And Xebec's 3200 drive tester, the toughest in the industry, ensures that the Sider will operate reliably. One more assurance of the $695 Sider's quality: it's UL Approved and FCC Class B rated.

"Only $695?"

But why is it only $695?

You pay less for the Sider than for other 10 MB hard disks simply because you're paying for the superior quality components inside the unit, not for a lot of retail overhead costs. Since First Class Peripherals sells direct, you avoid dealer and distribution expenses, and pay only for the product.

What about a guarantee?

Like many experienced Apple users, you may be reluctant to buy a hard disk priced at only $695 without first seeing for yourself how it performs. That's why First Class Peripherals offers you a reassuring, money-back guarantee that eliminates any risk on your part. Simply order the Sider and use it for 15 days. Then, if you're not entirely satisfied, return it and receive a full refund—no questions asked.

The Sider also comes with a full one-year limited warranty. Plus, there's a convenient, toll-free hotline you can call anytime you have a technical or service question, or need help.

Don't delay. Order the Sider now.

To receive the Sider 10 megabyte Winchester hard disk subsystem for only $695, simply order using the coupon below. For faster service, order by phone and charge to your VISA, MasterCard or American Express. (You can also call us if you have any questions or technical concerns about the Sider. We'll see you get the help you need.) Call toll-free:

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Extension 201

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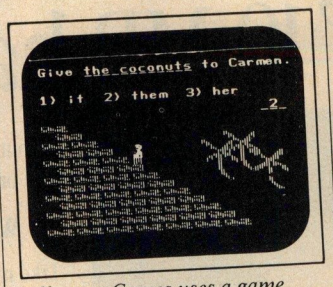
CIRCLE 105 ON READER SERVICE CARD

SERIES

ALLIGATOR LANGUAGE GAMES

Alligator Games is a set of tutorial and practice games designed to teach students the parts of speech. Students answer questions about noun-pronoun substitution, pronoun-verb agreement, preposition usage, adjective/adverb usage, and verbs and verb forms. When they answer correctly, an animated "warrior" climbs, one step at a time, up a pyramid to escape from an alligator pit below. When students answer incorrectly, their warrior descends two steps on the pyramid, and the program displays the correct answer. The program's easy-to-use system keeps track of students' names and scores, and teachers can create their own pyramid of questions. *(List Price: $59.95)*



Alligator Games uses a game format to teach students the parts of speech.

Requires: Apple II Plus, IIe, or IIc

Educational Activities, Inc.
P.O. Box 392
Freeport, NY 11520
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SERIES

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Discover simulates a laboratory for the problem-solving study of alien creatures. Students take charge of the lab to discover conditions necessary for the survival of eight aliens, analyzing known conditions such as food type, pattern of movement, and color. Students formulate and test hypotheses to determine the ideal atmosphere for these life forms. *(List Price: $55)*

Requires: Apple II, II Plus, IIe, or IIc

Sunburst
39 Washington Avenue
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CIRCLE READER SERVICE NO. **540**

SERIES

THE LEHRWARE SOUNDS LIBRARY

Designed for use with the AlphaSyntauri Computer Music System, The Lehr-Ware Sounds Library contains ten Preset Masters that each contain ten instruments. Available sounds include orchestral strings, orchestral winds, exotic instruments, natural sounds such as birds, voices, and sounds that use FM synthesis. *(List Price: $75)*

Requires: Apple II, II Plus, or IIe; AlphaSyntauri system

LehrWare
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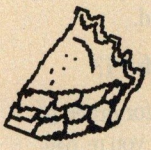

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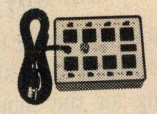

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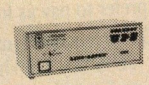

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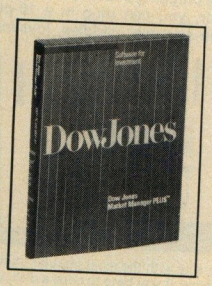

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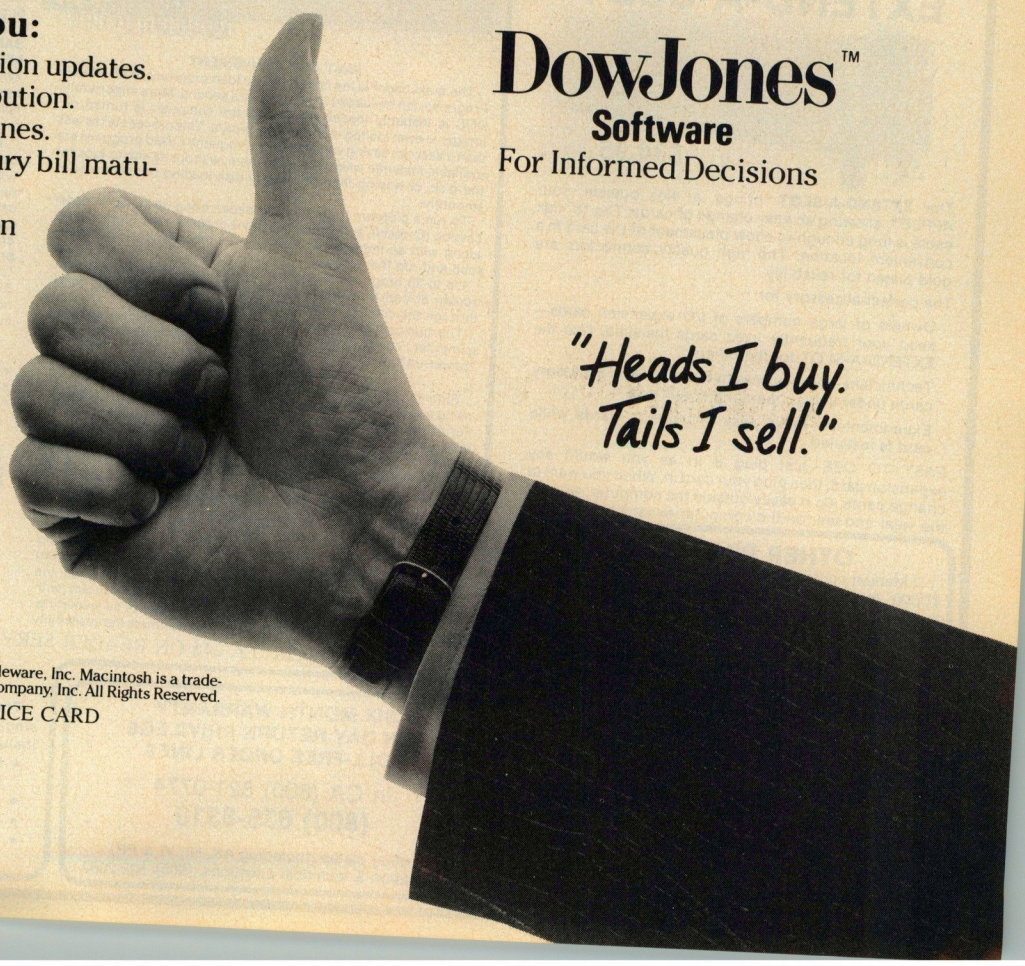

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SCRG PRODUCTS FOR THE APPLE COMPUTER

SWITCH-A-SLOT

$179.50

The **SWITCH-A-SLOT** is an expansion chassis, which allows the user to plug in up to four peripheral cards at one time. One of these cards is selected for use, and only that card draws power.

This product is especially useful where the software requires the printer to be in a particular slot, and the user wishes to choose between two or more printers.

- Allows up to four peripheral cards to be plugged into one peripheral slot.
- User selects desired card by front panel rotary switch.
- Only selected card draws power.
- Plugs into any peripheral slot.
- Saves wear and tear on delicate connectors.
- 18" cable connects Switch-a-slot to computer.

New—resistive terminations for better response

SWITCH-A-SLOT and EXTEND-A-SLOT work well with all slow to medium speed cards, such as Modems, Printers, Clock, 80 Column, Music, etc. They are not recommended for high speed data transfer devices such as disk drive controllers, alternate processor, and memory cards. These products may be incompatible with some alternate processor cards.

EXTEND-A-SLOT

$34.95

The **EXTEND-A-SLOT** brings a slot outside your APPLE™, allowing an easy change of cards. The 18" flex cable is long enough to allow placement of the card in a convenient location. The high quality connectors are gold plated for reliability.

The perfect accessory for:

Owners of large numbers of I/O expansion cards—keep your frequently used cards installed. Use the EXTEND-A-SLOT for the others.

Technicians—easy access to test points on accessory cards under actual operating conditions.

Experimenters—make easy changes to cards while card is installed.

EASY TO USE—just plug it in as you would any expansion card, then plug your card in. When you want to change cards, do it easily outside the computer, without the wear and tear on the computer expansion slot.

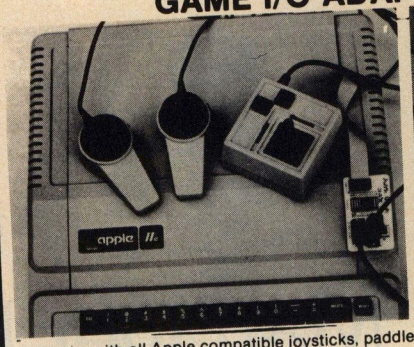
OTHER PRODUCTS

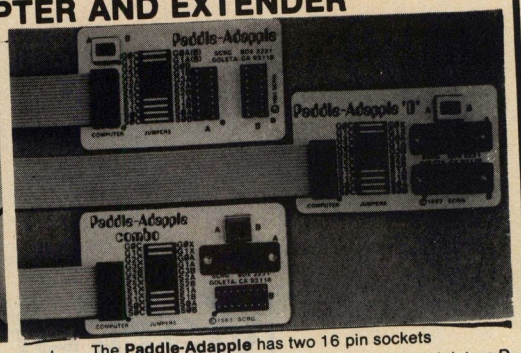
D Manual controller. Gives complete control over the $C000 through $C0FF range in hardware. Can be switched while program is running. $89.50.

MAGIC KEYBOARD (for][or][+ only). Re-encodes the keyboard to give alternate keyboards, such as DVORAK, ASK, 10-KEY, HEXIDECIMAL KEYPAD, etc. $49.50.

Paddle-Adapple

GAME I/O ADAPTER AND EXTENDER





- Works with all Apple compatible joysticks, paddles and other I/O devices.
- Select one of two devices or . . .
- Use 4 paddles simultaneously.
- Unique "Jumpers" socket allows you to configure to meet your needs.
- BPI™ users can have BPI™ device and paddles plugged in simultaneously. (**Paddle-Adapple** and **Paddle-Adapple Combo** only).
- Gives you four push-button inputs.
- Supports shift key modification.
- Exchange X & Y joystick axis.
- Small and compact — adheres to computer with supplied foam tape.
- All Strobes, annunciators and power available on all 16 pin connectors.
- Supplied with 18" cable.

$29.95

The **Paddle-Adapple** has two 16 pin sockets

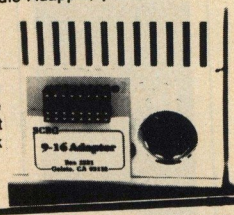
The **Paddle-Adapple "D"** works with the subminiature D connectors.

The **Paddle-Adapple Combo** has one 16 pin socket and one subminiature D connector.

NEW 9-16 Adapter

For Apple //e and //c

This product permits the use of most 16-pin I/O devices with the APPLE //c or //e. By plugging this adapter into the sub-miniature 'D' connector, you can plug in a 16-pin device, such as the Paddle-Adapple, paddles, joystick, KOALA PAD™, etc. The only limitations are those devices that use the annunciators or the C040 strobe, such as the POWER PAD™. Please note that the //c does not support four joystick inputs.



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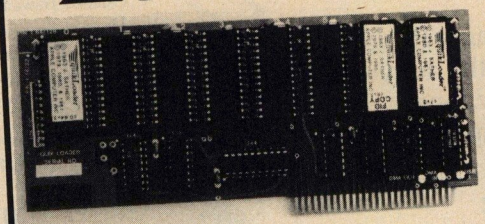
quikLoader™



FAST AND CONVENIENT

The quikLoader is the *fastest* way to load programs. **BAR NONE!** Programs can be loaded in fractions of a second. More importantly, DOS is instantly loaded every time the computer is turned on. Integer is even loaded in the language card. This process takes less than a second, saving valuable time. Frequently used programs are available *instantly* when you need them, without having to look for the disk, or hoping that the lengthy disk loading procedure goes smoothly.

To run a program from the quikLoader, bring up the quikLoader catalog (Q-reset), and the names of the programs will be displayed, along with an index letter. Pressing the index letter will instantly load and run the program.

Up to 23 programs on the quikLoader can be displayed on the screen at one time. If you have more programs, you may scroll through the catalog in either direction.

The quikLoader is **ideal** for applications requiring a dedicated computer. Your program can be automatically loaded and run at "power-up".

PROGRAMMING EPROMS

Putting your own programs on the quikLoader is easily done, using a separate EPROM programmer such as the **PROmGRAMER.** For APPLESOFT, INTEGER, or single machine language files, no programming knowledge is necessary. You **will** need experience if you want to save copy-protected or complex programs. The amount of experience necessary depends on the complexity of the program.

COMMERCIAL PROGRAMS

If you have a program that is valuable, it will become **more** valuable when it is instantly available to you. We are actively seeking licenses from software publishers to allow their popular programs to be made available for the quikLoader. Independent authors are encouraged to write programs suitable for the quikLoader. If the author wishes, we will market the program (with appropiate royalties), or the author can take care of all marketing. In either case, we will make known to our customers the availability of these programs.

We start your library of programs with the most popular utilities on the card, FID and COPYA. Now, if you have to copy a disk, you don't have to search for the master disk. You can start copying within 3 seconds after turning on the computer.

We are currently licensed to sell several very popular programs on EPROM. **DOUBLE—TAKE** by BEAGLE BROS., and **COPY II PLUS** by CENTRAL POINT SOFTWARE. The introductory price for DOUBLE—TAKE is $45.00. This includes the program exactly the same as you would buy it at your dealer for $34.95 (including disk and documentation), and a programmed 27128 EPROM (worth about $25.00). COPY][PLUS cost $65.00. This includes the original program (worth $39.95) and **two** programmed 27128's.

Other programs available directly from us or the publishers are, **BARKOVITCH I/O TRACER AND SINGLE STEP TRACE, MICRO/TYPOGRAPHER** from **TIDBIT SOFTWARE, ECHO** speech synthesizer software from **STREET ELECTRONICS,** and **MERLIN** assembler, from **ROGER WAGNER PUBLISHING.** More commercial programs are now in the works.

MEMORY CAPACITY

The quikLoader has eight sockets for EPROMs. These sockets can accommodate standard EPROMs from 2716 to 27512. These types can be freely intermixed. The memory capacity of the quikLoader depends on the EPROMS used. For example, the 2716 can hold 2K of programs, and the 27512 can hold 64K. (Frankly, the current costs of the 27512 is prohibitive,but should come down drastically in the next year.) At this writing, the least cost-per-bit is provided by the 2764, which can hold an 8K program. Using these "chips", the quikLoader becomes a 64K ROM. Using larger capacity EPROMs allows it to become a 128K, 256K, or even a 512K card. If more memory capacity is needed, the quikLoader operating system supports multiple quikLoaders.

INCREASED DISK CAPACITY

Since DOS is loaded from the quikLoader every time the computer is turned on, it is not necessary to take up valuable disk space with DOS. This will give you more than 5% additional space for programs and data on your disks.

ABOUT THE DESIGNER

The quikLoader was designed by Jim Sather, author of UNDERSTANDING THE APPLE][(forward by Steve Wozniak), published by QUALITY SOFTWARE (21601 Marilla Street, Chatsworth, CA 91311 (818) 709-1721).

SYSTEM REQUIREMENTS

The quikLoader plugs into any slot of the APPLE][+ or //e. If used in a][+, a slightly modified 16K memory card is required in slot O. A disk drive is required to save data.

DOS, INTEGER BASIC, FID, and COPYA are copyrighted programs of APPLE COMPUTER, INC. licensed to Southern California Research Group to distribute for use only in combination with quikLoader.

$179.50

CIRCLE 246 ON READER SERVICE CARD

PROmGRAMER™

The **PROmGRAMER** will read or program any of the standard single-volt EPROMS from the 2708 to the 27512. Features include:

- Slot independent operation for the APPLE // family of computers.
- Zero insertion force sockets accepts 24 or 28 pin devices.
- Disk based software allows easy customization of software.
- Complete instructions for loading software into quikLoader.

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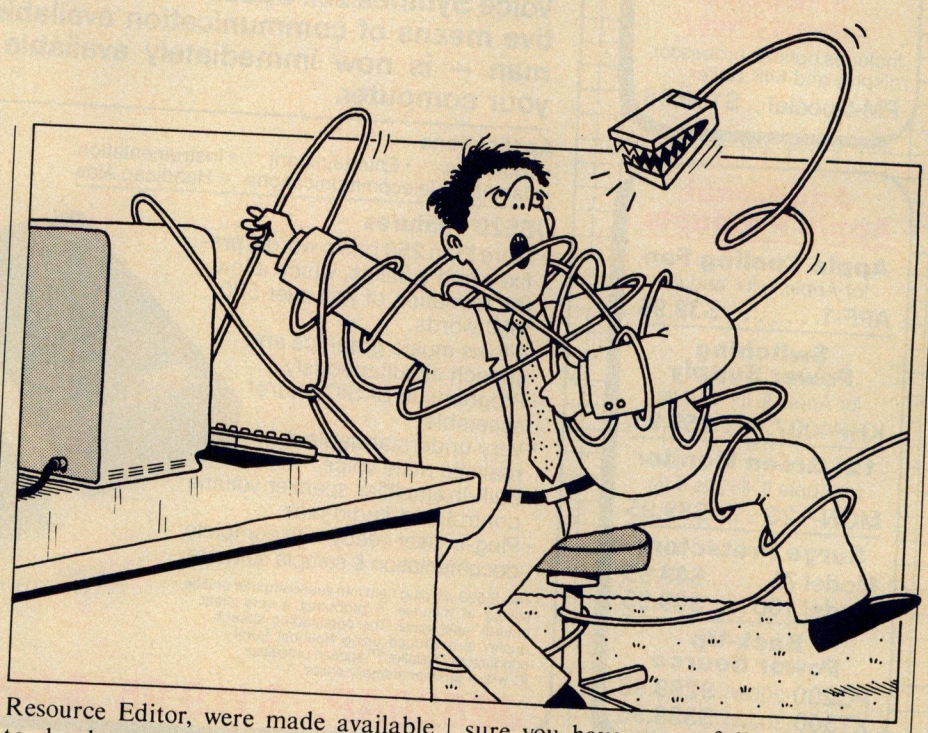
RESCUE SQUAD
BY MICHAEL CALLERY
Questions from our readers



CHRIS REED

APPLEWRITER 2.0 PRINTING PROBLEM

Q. *I recently exchanged my AppleWriter II for the ProDOS-based AppleWriter 2.0 and I am having trouble printing. With the older version, my files printed fine. The new version, however, prints a lot of extra spaces, as if it did not honor the margin settings. I have a Gemini 10X printer and a Grafstar interface card on my Apple IIe. Any suggestions?*

A. Several readers have written us about similar problems with Epson printers and Grappler interface cards. Apparently the Apple Writer printer drivers were rewritten for release 2.0 and contained a few glitches. Not all printer/interface-card combinations experience this problem, but if yours does, your authorized Apple dealer should have a printer-configuration disk that will fix the bugs. Dealers that don't have this disk can get it from Apple technical support.

Incidentally, similar problems have crept into AppleWorks. If you are having problems printing and/or the printer prints strange characters at the top of pages, you should check with your dealer for a similar remedy.

NEW SYSTEM FONTS

Q. *I am tired of Chicago as the system font on my Macintosh. I have Apple's Through the Looking Glass, and I like the font used for system messages with that disk. How can I change the system font?*

A. Macintosh fonts have assigned numbers; the system font is always font 0. Normally, Chicago occupies that slot.

You can change it easily, however, if you have one of Apple's resource utilities. These utilities, RMover and Resource Editor, were made available to developers and to those who purchased the software supplement to *Inside Macintosh*. The utilities are widely available to users through local users' groups.

First, use Apple's Font Mover utility to be sure the system file on your boot disk contains the font you want to use.

To change the system font, you must assign the current system font to an unused number and assign the desired font the number 0. This action takes the name of the font. The actual font, however, is stored in font resource 12, so you must also reassign font resource 12 to another number and your desired font must get resource number 12. You assign font-resource numbers with the following formula: font number × 128 + point size. Thus, font number 1 in 12 point is stored in font resource 140 (1 × 128+12). Font names are always stored with a point size of 0.

For your own sanity, you should work on a backup disk until you are sure you have successfully altered the system font. Then transfer your new system onto your application disk. For more information, keep your eyes on *A+*. We'll be covering Macintosh fonts in a future issue.

APPLE IIIe?

Q. *I have an Apple III and am frustrated by the limitations of the Apple II Emulation mode. Does a way exist to get a full 64K Apple II into my Apple III?*

A. A new product from Titan Technologies may solve your problem. The Titan III Plus II is an interface card that provides the extra 16K necessary for the bank-switched or language-card RAM. Used with Titan's Apple II Emulation diskette, it lets the Apple III run 64K Apple II programs. The board is also available with an extra 64K or 128K to use as a fast RAMdisk or for "extended bank switching," much like Titan's extra-capacity RAM cards for Apple II computers. Titan Technol-

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New 300/1200 Baud 212A Telephone Modem for your Apple II, II+ and *IIe*. Just plug in — Hayes compatible!

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Add speech capability to your Apple II, II+ and *IIe* computer with JAMECO's JE520 Voice Synthesizer. Speech—the most effective means of communication available to man — is now immediately available for your computer.

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Case Size: 7¼"Lx3¼"Wx1⅜"H

The JE520 will plug right into your computer and be talking in minutes. It produces a very clear, natural male voice. The outstanding speech quality is produced using National Semiconductor's Digitalker™ speech processor IC with 4 custom memory chips.

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- Uses Chinon Pinch-type mechanics • 163K unformatted • 35 tracks • Super quiet • Works with Apple Controllers or other compatibles (ACC-1) above • Complete with connector — just plug into your controller • Size: 5¾"W x 1⅝"H x 8"D • Wt.: 4 lbs.

ADD-12. . . . $159.95

APPLE™ *IIc* Compatible 5¼" Half-Ht. Disk Drive

- Same specs as ADD-12 (above) except no controller necessary.

ADD-IIc. NEW! $169.95

80-Column plus 64K RAM for your APPLE *IIe**

Now you can double the memory capacity and get an 80-column display format for your APPLE *IIe** computer at an affordable price. Just plug the JE864 card into your APPLE* and expand your display to 80 characters per line. Perfect for word processing. The JE864 also features 64K bytes of additional memory to allow programming not possible with standard APPLE *IIe** computers. Complete documentation included.

Board: High density board design squeezes 64K bytes of RAM onto a 2½" x 4½" board • Fully tested to assure proper operation.

Uses: Word processing — displays 1000 more characters per screen • Extra memory allows running of extremely large programs • Ultra High Resolution Graphics capability.

JE864. . . . . $79.95

APPLE Keyboard and Case for Apple II and II+*

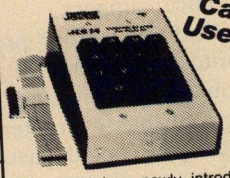
Special Functions!

KEYBOARD (KB-A68):
• 68 Keys • 15-Key Keypad • Direct connection with 16-pin ribbon connector • Special functions on number keys, including cursor controls, color demo, and one-touch disk catalog • Metal baseplate for durability (with 6 mounting holes) • Color (keys): white/grey • Size: 14½"L x 5½"W x 1½"H

CASE (EAEC-1):
• Accommodates KB-A68 • Pop-up lid for easy access • Fits power supply and motherboard too • Size: 15½"W x 18"D x 4¼"H

Part No.	Description	Price
KB-EA1	Apple Keyboard and Case.	$134.95
KB-A68	68-Key Apple Keyboard only.	$ 79.95
EAEC-1	Expanded Apple Enclosure Case only.	$ 59.95

Numeric/Auxiliary Keypad for your APPLE *IIe** *Visi Calc Users!*



The JE614 is a newly introduced numeric/auxiliary keypad for the APPLE *IIe*.* It offers the flexibility of a 10-key pad and the convenience of 23 directly accessible functions. Screen manipulating functions make word processing a snap and cursor controls make the keypad ideal for VisiCalc** users. The JE614 Keypad is housed in a durable metal enclosure and is color-coordinated with your APPLE *IIe* computer. Operation of the keypad can begin within minutes from unpacking. Special functions include: Home, Clear, Clear to End of Screen, Scroll-Up, Scroll-Down, Tab, Delete, Left, Right, Up and Down. Each key has auto-repeat. Size: 5⅞" L x 4-3/16" W x 1¼" to 2½" Slope.

JE614. . . . . $49.95

$10.00 Min. Order - U.S. Funds Only
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ogies informs us that another product, the Titan III Plus IIe interface card, may be available by the time you read this. The III Plus IIe card will offer full Apple IIe capabilities for your Apple III. For more information, contact Titan Technologies, 310 West Ann Street, Ann Arbor, MI 48104.

▶ PRINTING UNDER ProDOS

Q. *I'm having trouble when I use my printer from within a BASIC program running under ProDOS. Sometimes I get garbage on the screen, sometimes I seem to lose DOS, sometimes garbage appears on my listings. What's wrong?*

A. You could be doing one of several things wrong. Older Apple programs (before Apple's own 80-column card) use PR#0 to return printing to the screen after use of the printer. If you started printing from the 80-Column Active mode, you must turn off the printer with PR#3, *not* PR#0. This procedure may solve your problem.

Further, within programs you should issue PR# as a DOS command. Although PR# is an Applesoft command, the way that Apple DOS works demands that you use the command as a DOS command in a program. Do this by preceding the PR# with PRINT CHR$(4) as in

```
100 PRINT CHR$(4)"PR#1"
```

Both of these comments also apply to DOS 3.3.

▶ DELETING MAC FILES

Q. *When using MacPaint, I have run out of space on my storage disk and have not had a blank disk to insert. Is there any way I can delete a file while inside an application so that I can save my current image?*

A. Macintosh applications could provide this function, but most do not. If you have unwanted files, use the Save As command to save them to a file that you no longer want. The Mac will respond with a dialog box asking you whether you want to replace the disk file. Clicking on the Yes box will effectively delete the old file and replace it with the new. If you are a member of a Mac users' group, your group library probably has a set of desk accessories that can provide this function, as well as many other useful file-oriented functions. You need only install the desk accessory with the Desk Accessory Mover, also available from your users' group. Because you can use desk accessories within any Mac application, we highly recommend this approach.

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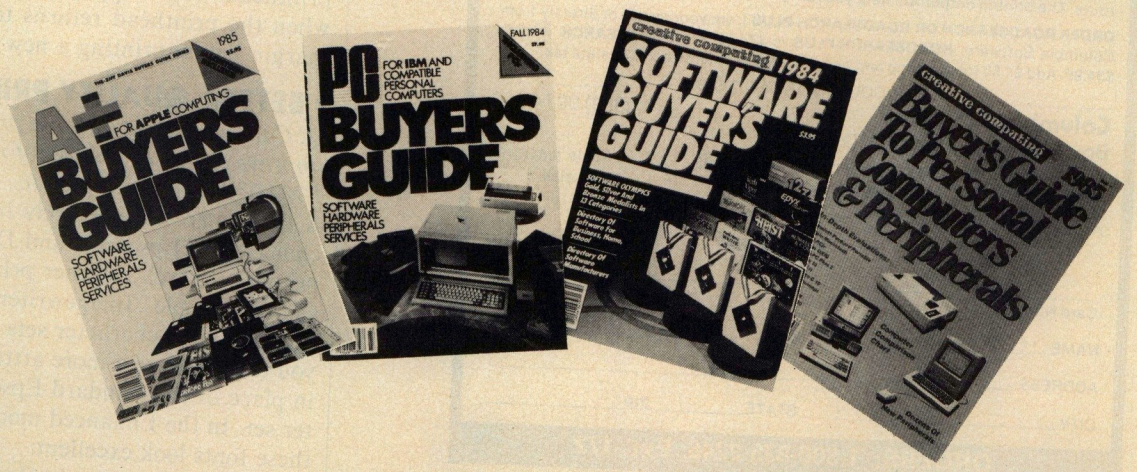

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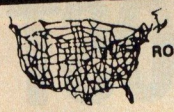

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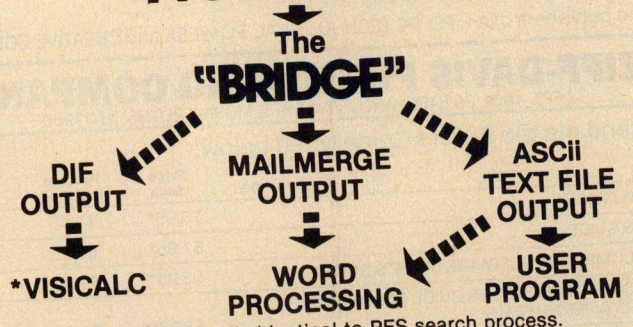

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▶ PRINT SHOP DIRECTION

Q. *I have an Apple IIe, Epson FX-80 printer, and Quadram APIC interface card. When I use Brøderbund's Print Shop, the Epson prints in one direction only. Can I make the Epson print bidirectionally to speed up printing?*

A. No, and you really don't want it to. Brøderbund intentionally set the graphics-dump portion of its program to print unidirectionally in order to obtain better graphics registration. Graphics printed bidirectionally show slippage between the passes of the printhead. This slippage is minimized when the printhead returns to the left margin before printing a new line.

▶ BETTER-QUALITY PRINT

Q. *Can you advise me on a program to improve the print quality of my Epson RX-80? I own an Apple IIc.*

A. Your hardware severely limits your choices. The Epson FX and JX series of printers (as well as other printers such as the Apple Imagewriter) feature downloadable character sets that allow you to substitute a more attractive font in place of the standard Epson character set. In the Enhanced mode, some of these fonts look excellent.

If you had an Apple IIe, you could add a new interface card such as the one from Spies Laboratories. This card takes the ASCII characters being sent to it for printing and converts them to graphics dots (from ROM on the card) before sending it to the printer. Because the printer is in the Graphics mode, printing is slower but prettier.

On the software side, SoftCraft's Fancy Font can coax even your RX-80 into producing high-quality output by translating your text into graphics, much as the Spies interface does. The program works only with CP/M. (A CP/M card for the IIc is available from Applied Engineering, Carrollton, TX 75006, (214) 492-2027.)

If your application really requires high-quality output, we'd recommend purchasing an inexpensive letter-quality printer. Most letter-quality printers under $500 are very slow (fewer than 20 characters per second) but produce excellent output. Another option would be to sell your RX-80 and buy a printer with downloadable character sets, or, even better, one of the new high-density dot-matrix printers such as the Epson LQ-1500 or Toshiba 1340. ✚

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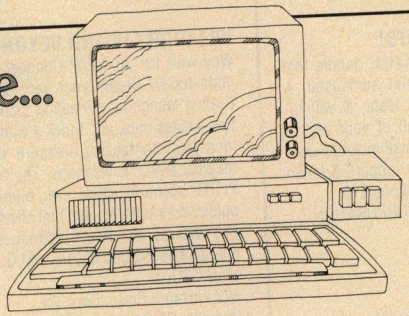

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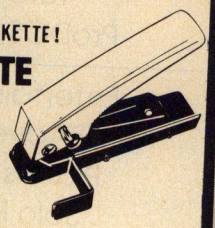

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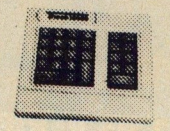

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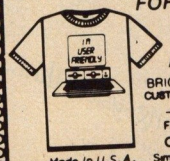

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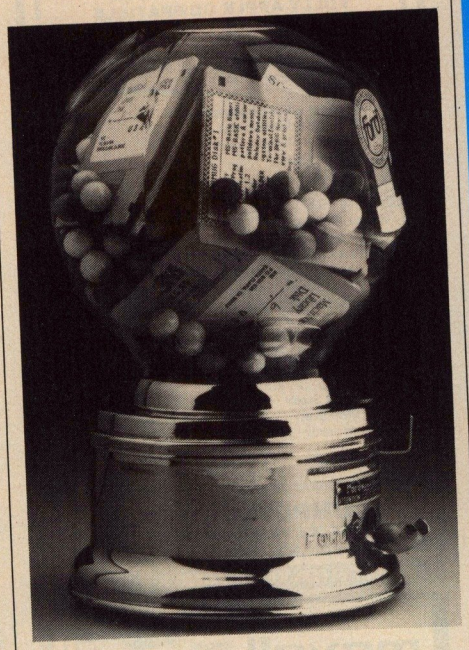

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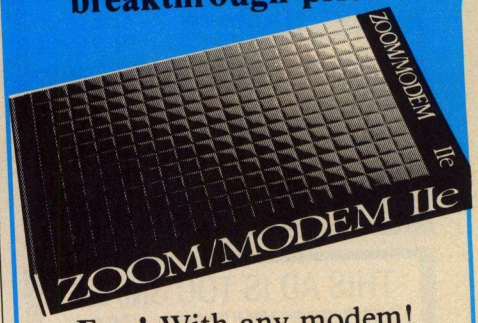

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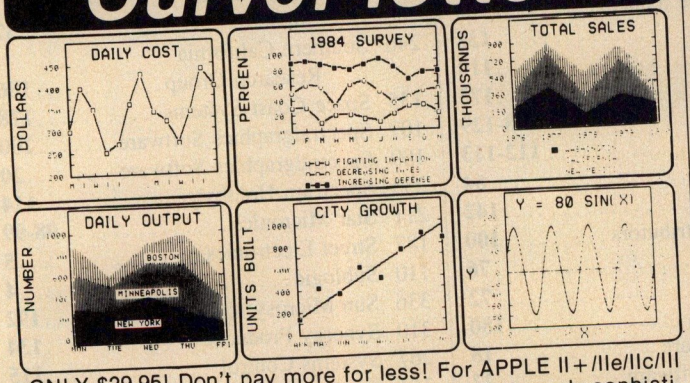

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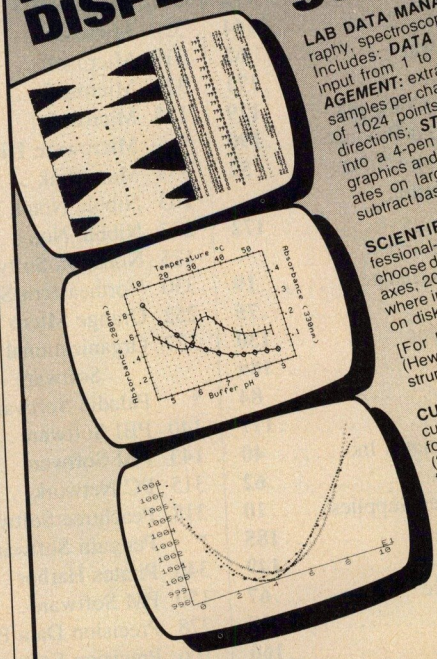

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▶ Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 6 months.

	(1.) Own	(2.) Plan to Buy
Apple II	A	H
Apple IIc	B	I
Apple *II*e	C	J
Lisa	D	K
Macintosh	E	L
Other (specify)	F	M
None	G	N

▶ Please indicate which of the following peripherals you plan to buy in the next 6 months. Then, for each one that you plan to buy, please indicate when this purchase will most likely be made.

	(3.) Plan to Buy	(4.) 1-3 Months	(5.) 4-6 Months
Printer	O	V	3
Modem	P	W	4
Disk Drive—Hard	Q	X	5
Disk Drive—Floppy	R	Y	6
Monitor—Black & White	S	Z	7
Monitor—Color	T	1	8

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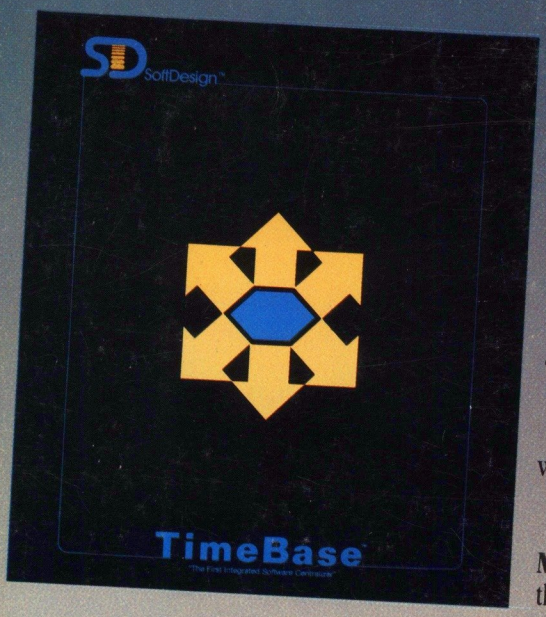

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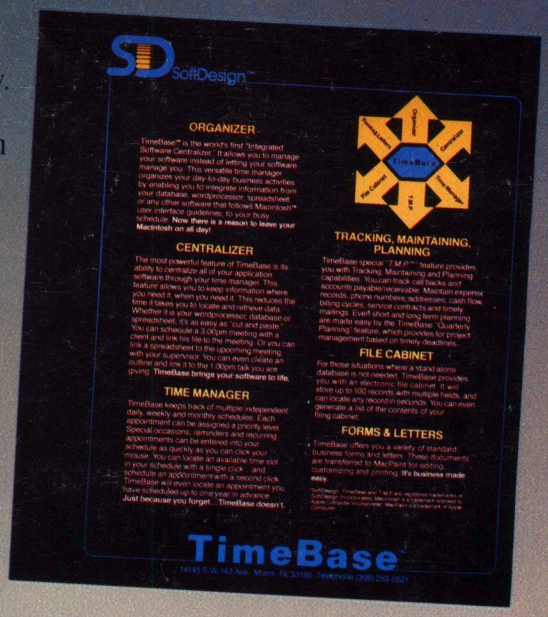

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